STABRO

SERVICE MANUAL
DIGITAL STORAGE OSCILLOSCOPE

MODEL DSS5040

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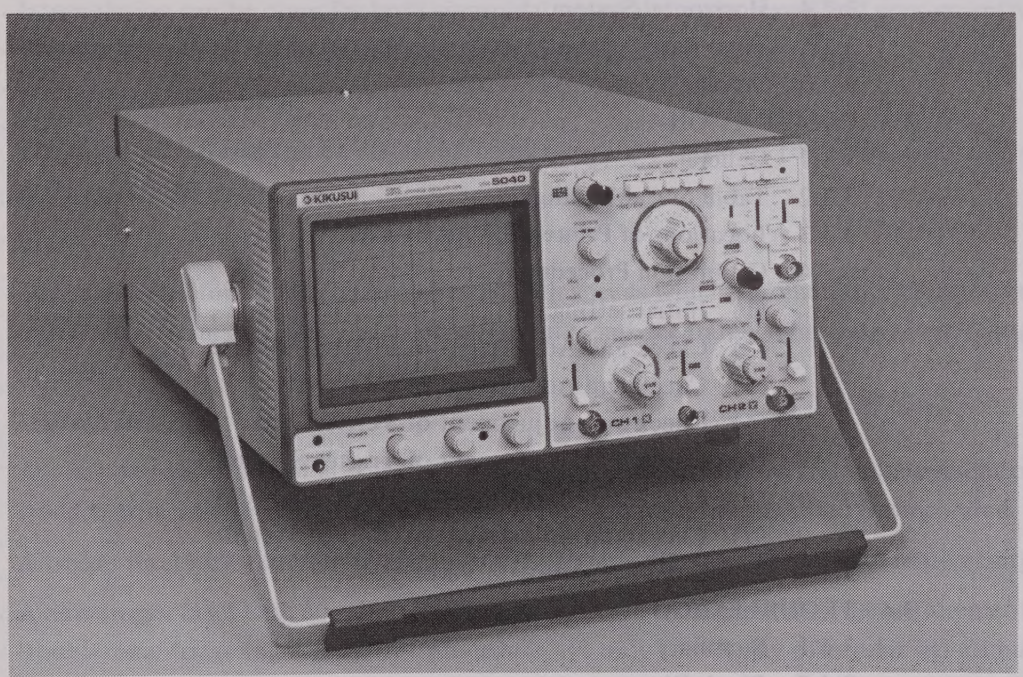
SERVICE MANUAL

DIGITAL STORAGE OSILLOSCOPE

DSS 5040



First Printing February 1987

Parts No.Z1-509-971

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1. GENERAL

1.1 GENERAL

The DSS5040 is a portable dual-channel digital storage oscilloscope. It is incorporated with an 8-bit CPU, renders a maximum sampling rate of 25 MHz and an effective storage frequency of 10 MHz, has a memory capacity of 1024 words per channel, and is able to be used as a dual-channel digital storage oscilloscope with interpolation of data saved in the memory, or is able to be used as a real-time oscilloscope of 20 MHz. The most outstanding features of the DSS5040 are as follows:

1.2 FEATURES

(1) Effective storage frequency range of DC – 10 MHz

Interpolation can be done for both sinusoidal waves and pulse waves and consequently even one-shot sinusoidal waves can be accurately displayed.

(2) Waveform magnification

The saved waveforms can be displayed being magnified by up to 100 times, from one of three selectable points.

(3) PEN OUT provision

The saved waveform data can be delivered with speeds which automatically changes depending on waveform, allowing you to obtain rapidly and accurately a hardcopy employing a pen recorder.

(4) Useful functions

The various useful functions such as for comparison of waveforms and measurement of slow speed signals, one-shot events, and signals before the triggered point are incorporated.

(5) A trigger level lock function which makes triggering adjustment procedure unnecessary

A new trigger level lock circuit is incorporated. This circuit eliminates the requirement of troublesome triggering adjustment procedure not only for display of regular signals but also for that of video signals and large duty cycle ratio signals.

(6) 40-MHz dual-channel real time oscilloscope

The DSS5040 is a version of the COS5040 whose performance has been proven. The DSS5040 can be used as a quality real oscilloscope.

(7) Compact, light, but sturdy

The oscilloscope is made of styrene acrylonitrile butadiene and steel plates. It is compact, light, but sturdy.

2. SPECIFICATIONS

(1) Vertical axes

○ Real mode (The same applies also to the storage mode unless specified otherwise.)

Item	Specification		Remarks
Sensitivity	NORM: 5 mV/DIV – 5 V/DIV x5 MAG: 1 mV/DIV – 1 V/DIV		1–2–5 sequence, 10 ranges
Sensitivity accuracy	NORM: ±3% or better x5 MAG: ±5% or better		10 to 35°C (50 to 95°F), 1 kHz, at 4 or 5 DIV Otherwise if in storage mode
Vernier vertical sensitivity	To 1/2.5 or less of panel-indicated value		
Frequency bandwidth	NORM: DC – 40 MHz, within –3 dB x5 MAG: DC – 20 MHz, within –3 dB AC coupling: Low limit frequency 10 Hz, –3 dB		With reference to 50 kHz, 8 DIV Otherwise if in storage mode
Rise time	NORM: 8.75 nsec or less x5 MAG: 17.5 nsec or less		Otherwise if in storage mode
Input impedance	1 MΩ ±2%, 28 pF ±2 pF		
Display mode	CH1	CH1 single channel	
	CH2	CH2 single channel	
	DUAL	CHOP: 1 sec/DIV – 1 msec/DIV ALT: 0.5 msec/DIV – 0.5 μsec/DIV	
	ADD	CH1 ± CH2	
Chopping repetition frequency	200 kHz ±0.02%		Otherwise if in storage mode
Input coupling	AC-GND-DC		
Polarity change	CH2 only		
CH1 signal output	Approx. 100 mV/DIV when open; approx. 50 mV/DIV when 50-ohm termination		
Maximum allowable input voltage	400 Vpeak (DC + AC peak)		AC: 1 kHz or lower

○ Storage mode

Item	Specification	Remarks
A/D converter	8-bit half-flush type	
Maximum sampling speed	25M samples/sec	
Vertical resolution	8 bits, 28 points/DIV, 9.14 DIV dynamic range	
Sensitivity accuracy	NORM: (±3%) + 1 LSB or better x5 MAG: (±5%) + 1 LSB or better	

Item	Specification	Remarks
Effective storage bandwidth	NORM: DC – 10 MHz x5 MAG: DC – 10 MHz	When sine interpolation is used.
Effective rise time	80 nsec or faster	When pulse interpolation is used.
Chopping repetition	50 Hz – 50 kHz, depending on TIME/DIV range	

(2) Triggering

○ Real mode (The same applies also to the storage mode unless specified otherwise.)

Item	Specification	Remarks
Signal source	INT, LINE, EXT	
Internal triggering source select	CH1, CH2, and VERT MODE When in VERT MODE, triggering source depends on vertical channel being used. When in ADD mode, CH1 signal is used as triggering source signal.	VERT MODE is effective only when in ALT or SINGLE sweep mode. Triggering is adjustable with LEVEL control.
Coupling	AC, HF REJ, TV, DC	
Polarity	+ or –	
Sensitivity	DC – 10 MHz: 0.5 DIV (0.1 V) DC – 40 MHz: 1.5 DIV (0.2 V) Video signal: 2.0 DIV (0.2 V) AC coupling: Attenuates signal components of lower than 10 Hz HF REJ: Attenuates signal components of higher than 50 kHz	The values enclosed in the parentheses are the input sensitivities when in the EXT triggering mode. The specifications of DC – 10 MHz and DC – 40 MHz are applicable to real mode only.
Triggering modes	AUTO: Sweep runs in the free mode when no triggering input signal is applied.	Meets trigger sensitivity specification for signals of 50 Hz or higher.
	NORM: When no triggering signal is applied, the trace is in the READY state and not displayed.	Otherwise if in storage mode
	SINGL: One-shot sweep with trigger signal. Can be reset to the READY state by means of RESET switch. The READY lamp (LED) turns on when in the READY state or in the sweep operation.	Otherwise if in storage mode
LEVEL LOCK	Satisfies the value of the above trigger sensitivity plus 0.5 DIV (0.05 V). At sine wave (50 Hz – 40 MHz).	Repetition frequency 50 Hz – 10 kHz if in storage mode
EXT triggering signal input	EXT HOR input terminal is used in common.	Applicable to real mode only
Input impedance	1 MΩ ±2%, approx. 25 pF	
Maximum allowable input voltage	100 Vpeak (DC + AC peak)	AC: 1 kHz or lower

○ Storage mode

Item	Specification	Remarks
Triggering sensitivity	DC – 400 kHz: 0.5 DIV (0.1 V)	
Triggering modes	NORM: When triggering has become ineffective, the displayed waveform remains as saved with previous triggering and the circuit remains ready to accept triggering.	If in the ROLL mode, newly stored waveform is displayed even when in the READY state.
	SINGL: Waveform for one-shot sweep cause by triggering is automatically saved. When saving is reset, the circuit again becomes the READY state. The READY lamp (LED) turns on when in the READY state or in sweep operation.	If in the ROLL mode, newly stored waveform is displayed even when in the READY state.
Predelayed triggering point	Horizontal: 2 DIV, 5 DIV, or 8 DIV point	
Jitter canceller operating lamp	0.5 μsec – 1 μsec/DIV	

(3) Horizontal axis (Time base)

○ Real mode (The same applies also to the storage mode unless specified otherwise.)

Item	Specification	Remarks
Sweep time	NORM: 0.2 μsec – 1 sec/DIV	1–2–5 sequence, 21 ranges
Sweep time accuracy (1)	±3%	10 to 35°C (50 to 95°F) Accuracy of sweep time for 8 divisions in graticule center
Sweep time accuracy (2)	±3%	10 to 35°C (50 to 95°F) When one time marker is assigned to each graticule division and the 2nd and 10th markers are aligned to the graticule lines, accuracy of each marker with respect to the 10 divisions, except the 1st and 11th markers.
Vernier sweep time control	To 1/2.5 or slower of panel-indicated value	Applicable to real mode only
Holdoff time	Continuously variable	Applicable to real mode only
Sweep magnification	10 times	
Magnified sweep time accuracy (1)	0.5 μsec – 1 sec/DIV: ±5% 0.2 μsec/DIV: ±8%	10 to 35°C (50 to 95°F) Accuracy of sweep time for 8 divisions in graticule center, excluding 10%-portions from both end of sweep

Item	Specification	Remarks
Magnified sweep time accuracy (2)	0.5 μsec – 1 sec/DIV: ±5% 0.2 μsec/DIV: ±8%	10 to 35°C (50 to 95°F) When one time marker is assigned to each graticule division and the 2nd and 10th markers are aligned to the graticule lines, accuracy of each marker with respect to the 10 divisions, excluding the 1st and 11th markers and 10%-portions from both ends of sweep
EXT HOR mode	Trace swept by an external horizontal signal applied to the EXT TRIG IN terminal. Vertical axis modes are CH1, CH2, DUAL and ADD modes (indicated).	Applicable to real mode only
Sensitivity	Approx. 0.1 V/DIV	
Frequency bandwidth	DC – 1 MHz (–3 dB)	
Phase difference between vertical axes	Within 3° (at DC – 50 kHz)	

○ X-Y mode

Item	Specification	Remarks
Inputs	X-axis: CH1 input signal Y-axis: CH2 input signal	
X-axis sensitivity	Same as CH1 vertical axis	
Sensitivity	NORM: ±4% x5 MAG: ±6%	10 to 35°C (50 to 95°F) 1 kHz, at 4 or 5 DIV
Frequency bandwidth	DC – 1 MHz (–3 dB)	
Y-axis sensitivity	Same as CH2 vertical axis	
Sensitivity accuracy	Same as CH2 vertical axis	
Frequency bandwidth	Same as CH2 vertical axis	
X-Y phase difference	Within 3° (at DC – 50 kHz)	

○ Storage mode

Item	Specification	Remarks
Horizontal resolution	10 bits/channel, 100 points/bit, 1024 points	
Sampling speed	100 samples/sec – 25M samples/sec	Sampling speed at 1 sec – 0.2 μsec/DIV depends on TIME/DIV setting. At 1 μsec – 0.2 μsec/DIV, sampling speed is fixed at 25 M samples/sec and waveform is expanded by interpolation.
Accuracy of sampling speed	0.02%	
ROOL mode	Automatic switching of 1 sec – 0.1 sec/DIV range	
Time base magnification by interpolation	Up to 100 times of time base on which data has been save from the above time base	Magnification is done with reference to the portion selected by triggering point
Type of interpolation	Sine interpolation and pulse interpolation	
Processing time	Pulse interpolation Average: 0.067 sec/channel Maximum: 0.2 sec/channel Sine interpolation Average: 0.7 sec/channel Maximum: 2.4 sec/channel	
SAVE mode	As you press the SAVE switch, the oscilloscope is set to the SAVE mode and data being acquired is saved.	
REFERENCE	As you press the REF switch, data is stored with reference to the waveform currently displayed on the CRT screen. As you press the REF switch again, the REFERENCE state is released.	Not applicable when in the DUAL mode
VIEW TIME	Approx. 0.5 sec – 5 sec, continuously variable	Excluding arithmetic processing time
PEN OUT function	As PEN switch is pressed when in SAVE mode, signal for displayed waveform is delivered. As PEN switch is pressed again, signal is reset.	
Output voltage	X-, Y-axis: 0.1 V/DIV Sync: TTL, positive	
Output impedance	X-, Y-axis: Approx. 200 Ω Sync: Approx. 470 Ω	
Output voltage accuracy	±10% or better of value displayed on CRT	
Pen speed	Automatically variable for approx. 55 msec – 4.4 sec in response to difference with respect to subsequent data	

(4) Z axis

Item	Specification	Remarks
Sensitivity	3 Vp-p (Trace becomes brighter with negative input.)	
Frequency range	DC – 5 MHz	
Input resistance	Approx. 5 kΩ	
Allowable input voltage	50 Vpeak (DC + AC peak)	AC [illegible]

(5) Calibration voltage

Item	Specification	Remarks
Waveform	Positive square wave	
Frequency	1 kHz ±20%	
Output voltage	0.5 Vp-p, ±2%	
Output resistance	Approx. 500 Ω	

(6) CRT

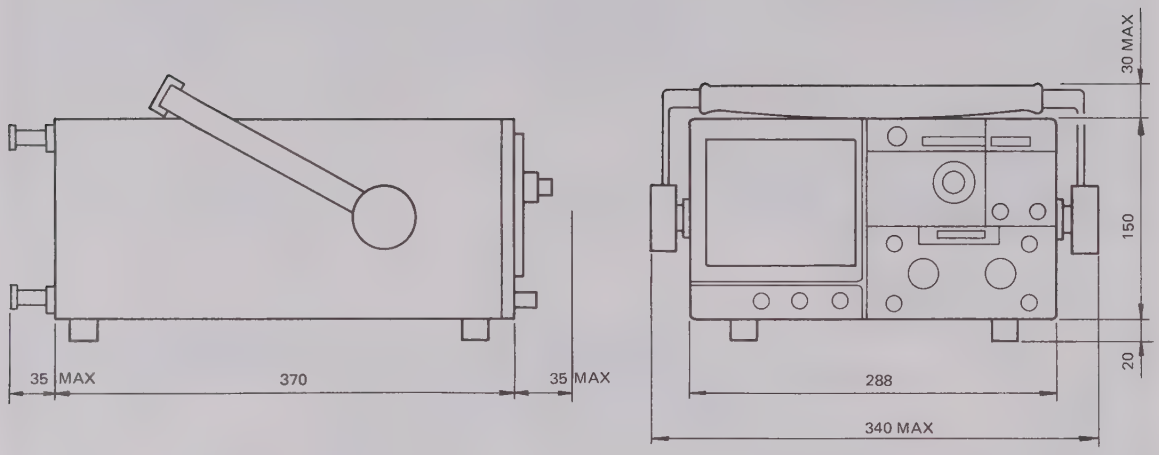
Item	Specification	Remarks
Type	6-inch rectangular type internal graticule	
Phosphor	P31	
Acceleration voltage	Approx. 12 kV	
Effective screen size	8 x 10 DIV	1 DIV = [illegible]
Graticule	Internal graticule; continuously adjustable illumination	

(7) Line power requirements

Item	Specification	Remarks
Voltage range	90 – 110 V, 104 – 125 V, 194 – 236 V, 207 – 250 V	Selectable by connector change
Frequency	50 Hz or 60 Hz	
Power consumption	Approx. 55 VA	

(8) Mechanical specifications

Item	Specification	Remarks
Dimensions	288 W x 150 H x 370 D mm (11.37 W x 5.19 H x 14.57 D in.)	Mainframe
	340 W x 200 H x 440 D mm (13.39 W x 7.87 H x 17.32 D in.)	Maximum
Weight	Approx. 7.4 kg (16 lbs)	



(9) Operating environment

To satisfy specifications: 5 to 35° C (41 to 95° F), 85% RH or less
Maximum operating ranges: 0 to 40° C (32 to 104° F), 90% RH or less

(10) Accessories

P060-S probes (10:1, 1:1, 1.5 m) 2
942A terminal adaptors 2
Power cord 1
Operation manual 1

○ Specifications and contents of this manual are subject to change without notice.

3. MAINTENANCE

3.1 PREVENTIVE MAINTENANCE

The major preventive maintenance items are cleaning and visual inspection of the instrument. It is highly recommendable to render preventive maintenance service periodically on an established time schedule.

3.1.1 Removing the Case

To remove the case, remove the four screws as shown in Figure 3-1 and pull out the instrument chassis.

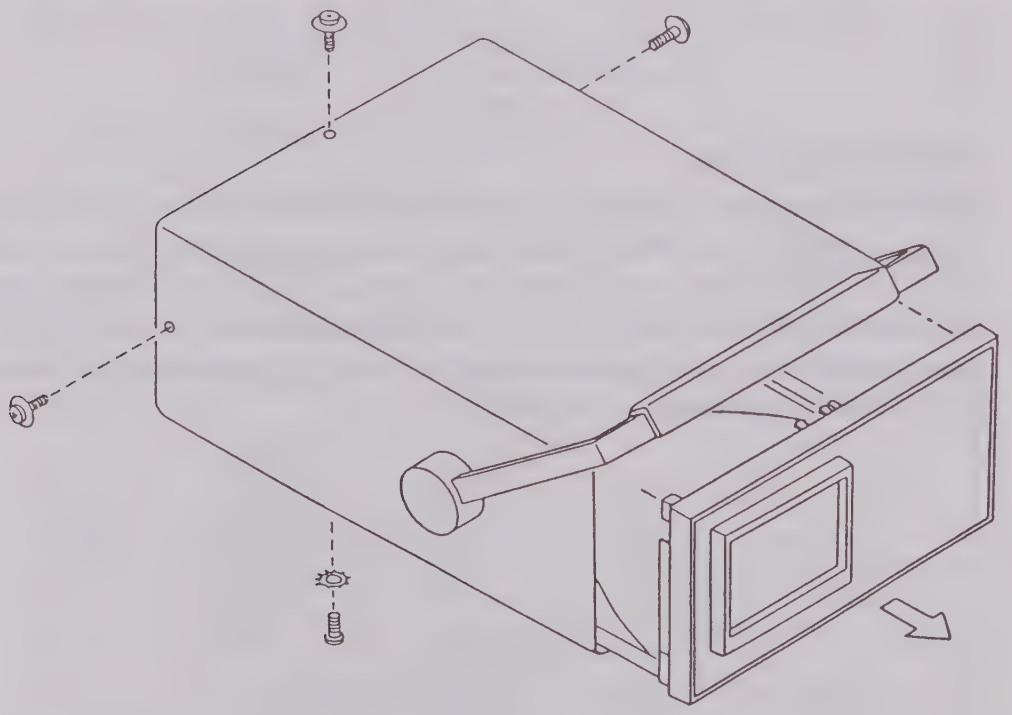


Figure 3-1

3.1.2 Cleaning the Instrument

Blow away dust collected in the instrument by using a clean compressed air. Clean especially carefully the insulators of the high voltage circuit in order to prevent insulation degradation. Also clean carefully the heat sinks to prevent heat radiation degradation.

CAUTION

Do not wash the instrument with water or detergent. To remove adherent dirt from inside or outside of the instrument, use of chlorophlorocarbon (Freon) is recommended. Never use benzene, thinner, toluene or other volatile or highly active chemicals to clean either inside or outside of the instrument.

3.1.3 Check of Semiconductors

It is not recommendable to attempt to check directly the transistors and other semiconductors of the instrument for periodical maintenance service. It is most recommendable to find out whether such circuit elements are operating normally or not through proper manipulation of the instrument. If the instrument does not operate normally when it is manipulated properly, render appropriate service referring to the paragraphs of calibration or troubleshooting given in this manual.

3.2 PERFORMANCE CHECK

3.2.1 General

Action check of function with the instrument is noted here. Every item is comprised of various checking points. And if there is any irregular action found in any item, it means malfunction or trouble, do necessary steps for readjustment or repair according to the item of calibration.

Initial setting of various function check for every kinds of our instrument is shown below as table 3-1.

	Function	Setting	Remarks
Power	POWER	ON	
CRT group	INTEN	Ample brightness	Position between 2 ~ 3 o'clock points
	FOCUS	Setting for best focus point	
	ILLUM	Maximum counterclockwise rotation	
Vertical axis group	Vertical sensitivity	5 mV/DIV	For both of CH1, CH2
	VARIABLE	CAL'D	For both of CH1, CH2
	PULL x5MAG	OFF	For both of CH1, CH2
	Input coupling	DC	For both of CH1, CH2
	POSITION	At the center point	For both of CH1, CH2
	VERT MODE	CH1	
	CH2 INV	OFF	
Trigger group	INT TRIG	VERT MODE	
	SOURCE	INT	
	COUPLING	AC	
	SLOPE	+	
	LEVEL	LOCK (Maximum counter-clockwise rotation)	
	SWEEP MODE	AUTO	
Horizontal axis group	TIME/DIV	1 ms	
	VARIABLE	CAL'D	
	PULL x10MAG	OFF	
	POSITION	At the center point	
	HOLDOFF	Maximum counterclockwise rotation	
Storage group	STORAGE/REAL	REAL	
	SINE/PULSE	PULSE	
	SAVE	OFF	
	REF	OFF	
	PEN	OFF	

Table 3-1 Initial Setting

3.2.2 Vertical System Check

(1) STEP balance check

1) Initialize the instrument according to Table 3.1.

2) Set the CH1 input coupling to GND, and confirm that the base line on CRT screen is shifted within the range of ±0.2 DIV when the vertical sensitivity is switched as follows: 5 mV/DIV → 10 mV/DIV → 20 mV/DIV → 50 mV/DIV.

3) Set VERT MODE to CH2 and set the CH2 input coupling to GND.

4) Confirm that the base line for CH2 is also shifted within the range of ±0.2 DIV when the vertical sensitivity is switched in the same way as that for CH1.

(2) x5MAG balance check

1) Initialize the instrument according to Table 3.1.

2) Set the CH1 input coupling to GND, and pull and push the VARIABLE button for CH1 to turn on and off the x5MAG function for CH1. Confirm that the base line on CRT screen is shifted within the range of ±1.0 DIV when the x5MAG function is switched from ON to OFF and vice versa.

3) Set VERT MODE to CH2 and set the CH2 input coupling to GND.

4) Confirm that the base line for CH2 is also shifted within the range of ±1.0 DIV when the x5MAG function for CH2 is turned on and off.

(3) DC balance check

1) Initialize the instrument according to Table 3.1.

2) Set the CH1 input coupling to GND, and turn VARIABLE for CH1 from the right maximum to left maximum. Confirm that the base line on CRT screen is shifted within the range of ±0.5 DIV when the VARIABLE is turned.

3) Set VERT MODE to CH2 and set the CH2 input coupling to GND.

4) Confirm that the base line for CH2 is also shifted within the range of ±0.5 DIV when the VARIABLE for CH2 is turned in the same way as above.

(4) ADD balance check

1) Initialize the instrument according to Table 3.1.

2) Set VERT MODE to ALT.

3) Set the base lines for CH1 and CH2 exactly at the center of the CRT screen (place one base line on the other).

4) Set VERT MODE to ADD, and see if the base line is shifted only within the range of ±0.5 DIV.

(5) CH2 INV balance check

1) Initialize the instrument according to Table 3.1.

2) Set VERT MODE to CH2 and CH2 input coupling to GND.

3) Place the base line at the center of the CRT screen by POSITION (CH2).

4) Turn on and off the INV function for CH2, and see if the base line is shifted only within the range of ±1 DIV.

(6) Vertical position check

1) Initialize the instrument according to Table 3.1.

2) Set the CH1 input coupling to GND, and turn POSITION (CH1) from right maximum to left maximum.
Confirm that the base line moves on the entire screen when the POSITION is turned.

3) Set VERT MODE to CH2 and set the CH2 input coupling to GND.

4) Confirm that the base line for CH2 also moves on the entire screen.

(7) Vertical sensitivity check (see Table 3.2)

1) Initialize the instrument according to Table 3.1.

2) Input an amplitude calibration signal from a vertical axis calibrator to CH1, and confirm that the sensitivity error for each range is within ±3% (±5% when the x5MAG function is on).

3) Set VERT MODE to CH2.

4) Confirm that the sensitivity error for each range for CH2 is also within ±3% (±5% when the x5MAG function is on).

Table 3.2 Vertical Sensitivity Error Ranges

Vertical axis	x5MAG	Oscilloscope range	Vertical axis calibrator range	Oscilloscope CRT screen amplitude	Sensitivity error range
CH1 & CH2	OFF	5 mV/DIV	20 mV	4 DIV	±0.12 DIV
		10 mV/DIV	50 mV	5 DIV	±0.15 DIV
		20 mV/DIV	0.1 V	5 DIV	±0.15 DIV
		50 mV/DIV	0.2 V	4 DIV	±0.12 DIV
		0.1 V/DIV	0.5 V	5 DIV	±0.15 DIV
		0.2 V/DIV	1 V	5 DIV	±0.15 DIV
		0.5 V/DIV	2 V	4 DIV	±0.12 DIV
		1 V/DIV	5 V	5 DIV	±0.15 DIV
		2 V/DIV	10 V	5 DIV	±0.15 DIV
		5 V/DIV	20 V	4 DIV	±0.12 DIV
	ON	1 mV/DIV	5 mV	5 DIV	±0.25 DIV

(8) Vertical VARIABLE check

1) Initialize the instrument according to Table 3.1.

2) Input an amplitude calibration signal of 20 mVp-p from a vertical axis calibrator to CH1. (The amplitude on CRT screen is 4 DIV.)

3) Turn the CH1 VARIABLE to the left maximum, and confirm that the amplitude on CRT screen is 1.6 DIV or less.

4) Set VERT MODE to CH2 to input the above signal to CH2.

5) Confirm that the amplitude on CRT screen is also 1.6 DIV or less when the CH2 VARIABLE is turned to the left maximum.

(9) Vertical low frequency characteristic check

1) Initialize the instrument according to Table 3.1.

2) Set the CH1 sensitivity to 10 mV/DIV.

3) Input a square waveform signal of approximately 1 kHz from a vertical axis calibrator to CH1, and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 5 DIV.

4) Confirm that the flatness characteristic of the observed square waveform is 3% or less.

5) Set VERT MODE to CH2.

6) Set the CH2 sensitivity to 10 mV/DIV, and input the above signal to CH2.

7) Confirm that the flatness characteristic of the observed square waveform for CH2 is also 3% or less.

(10) Input attenuator (ATT) frequency characteristic check

1) Initialize the instrument according to Table 3.1.

2) Input a square waveform signal of approximate 1 kHz from a vertical axis calibrator to CH1, and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 5 DIV.

3) Confirm that the flatness characteristic of the observed square waveform is 3% or less.

4) Confirm that the flatness characteristic of the observed square waveform is 3% or less at each range of CH1.

5) Set VERT MODE to CH2 and input the above signal to CH2.

6) Confirm that the flatness characteristic of the observed square waveform for CH2 is also 3% or less at each range of CH2.

(11) Vertical high frequency characteristic check

1) Initialize the instrument according to Table 3.1.
2) Set the CH1 sensitivity to 10 mV/DIV.
3) Set TIME/DIV to 0.2 μs/DIV.
4) Input a square waveform signal of approximately 1 MHz from a vertical axis calibrator to CH1, and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 5 DIV.
5) Confirm that the flatness characteristic of the observed square waveform is 5% or less.
6) Set VERT MODE to CH2, and the CH2 sensitivity to 10 mV/DIV.
7) Input the above signal to CH2, and confirm that the flatness characteristic of the observed square waveform for CH2 is also 5% or less.

3.2.3 Trigger System

(1) TRIG SOURCE check

1) Initialize the instrument according to Table 3.1
2) Set TIME/DIV to 10 μs/DIV.
3) Input a signal of 50 kHz from a signal generator to CH1, and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 4 DIV.
4) Confirm that the waveform on CRT screen looks still without jitter.
5) Switch VERT MODE to CH2, and input the above signal to CH2.
6) Confirm that the waveform on CRT screen also looks still without jitter for CH2.
7) Switch TRIG SOURCE to LINE.
8) Set TIME/DIV to 5 ms/DIV.
9) Apply the LINE signal from a signal generator to CH2 input and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 4 DIV.
10) Confirm that the waveform on CRT screen looks still without jitter.
11) Switch TRIG SOURCE to EXT and switch VERT MODE to CH1.
12) Input a signal of 50 kHz from a signal generator to CH2 and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 4 DIV, as done in step 3).
13) Set TIME/DIV to 10 μs/DIV.
14) Apply the signal from "CH1 SIGNAL OUT" on rear panel to EXT input terminal.
15) Confirm that the waveform on CRT screen looks still without jitter, as done in step 4).

(2) TRIG COUPLING check

1) Initialize the instrument according to Table 3.1.

2) Input amplitude calibration signal (10 mVp-p) from a vertical axis calibrator to CH1. (the amplitude of the waveform observed on CRT screen becomes 2 DIV.)

3) Release TRIG LEVEL from LEVEL LOCK, and turn the TRIG LEVEL dial till the waveform of the signal input to CH1 looks still without jitter on CRT screen. (The trigger level should be set at the middle of the waveform amplitude.)

4) Change the amplitude of the signal input to CH1 to 20 mVp-p (4 DIV), and confirm that the waveform on the CRT screen looks still because it is triggered correctly and that the trigger position has been shifted.

5) Switch TRIG COUPLING to DC.

6) Set the amplitude of the signal to 2 DIV.

7) Execute the same operation as step 3), and change the amplitude of the signal input to CH1 to 4 DIV. Then, confirm that the waveform on the CRT screen looks still because it is triggered correctly and that the trigger position has not been shifted.

8) Switch TRIG COUPLING to AC.

9) Input a signal of 1 MHz from a signal generator to CH1, and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 4 DIV.

10) Set TIME/DIV to 1 μs/DIV.

11) Turn the TRIG LEVEL dial to give a trigger to the above signal.

12) Set TRIG COUPLING to HF REJ, and confirm that a trigger is not given to the above signal (because the trigger signal is attenuated).

13) Switch TRIG COUPLING to TV.

14) Apply a video signal of 4 DIV to the CH1 input terminal.

15) Set TRIG SLOPE to "–".

16) Confirm that the TV.V signal is observed when TIME/DIV is in the low speed range of 0.1 or more ms/DIV and that the TV.H signal is observed when TIME/DIV is in the high speed range of 50 or more s/DIV.

(3) TRIG SLOPE check

1) Initialize the instrument according to Table 3.1.

2) Input an amplitude calibration signal of 20 mVp-p from a vertical axis calibrator to CH1.

3) Release TRIG LEVEL from LEVEL LOCK, and turn the TRIG LEVEL dial till the waveform of the signal input to CH1 looks still without jitter on CRT screen. (The trigger level should be set at the middle of the waveform amplitude.)

4) Confirm that the waveform on the CRT screen is triggered correctly at the plus (+) slope.

5) Set TRIG SLOPE to "–".

6) Confirm that the waveform on the CRT screen is triggered correctly at the minus (–) slope.

(4) SWEEP MODE check

1) Initialize the instrument according to Table 3.1.

2) Input a signal of 50 kHz to CH1 from a signal generator, and adjust the signal till the amplitude of the waveform observed on CRT screen becomes 4 DIV.

3) Set TIME/DIV to 10 μs/DIV.

4) Release TRIG LEVEL from LEVEL LOCK, and turn the TRIG LEVEL dial slowly clockwise. Confirm that the waveform in FREE RUN state starts being triggered at the minus (–) peak and the trigger position moves to reach the plus (+) peak as the dial is turned. Also confirm that the waveform returns to the FREE RUN state when the dial is turned further.

5) Set the CH1 input coupling to GND, and confirm that the signal waveform disappears from the screen, leaving only one base line.

6) Switch the CH1 input coupling back to DC.

7) Set SWEEP MODE to NORM, and turn the TRIG LEVEL dial counterclockwise up to the maximum (immediately before LEVEL LOCK).

8) Turn the TRIG LEVEL dial clockwise, and confirm that a waveform appears on the CRT screen and starts being triggered at the minus (–) peak. Also confirm that the trigger position moves to reach the plus (+) peak and the waveform disappears from the screen when the dial is turned further.

9) Set the CH1 input coupling to GND when the signal is triggered, and confirm that the base line and waveform disappear from the screen.

10) Switch the CH1 input coupling back to DC, and trigger the signal by turning the TRIG LEVEL dial.

11) Set SWEEP MODE to SINGLE.

12) Set TIME/DIV to 1 s/DIV.

13) Set the CH1 input coupling to GND, and press SINGLE. (PUSH TO RESET).

Confirm that the LED at the upper right side of the SINGLE switch is turned on to indicate that the instrument has entered the single sweep wait mode.

14) Sset the CH1 input coupling back to DC.

15) Confirm that a signal is input and triggered and that a single sweep is observed.

3.2.4 Horizontal System

(1) Horizontal axis sensitivity check (for X-Y)

1) Initialize the instrument according to Table 3.1.
2) Set TIME/DIV to "X-Y or EXT HOR".
3) Set TRIG SOURCE to EXT.
4) Set TRIG COUPLING to DC.
5) Set VERT MODE to CH2 (X-Y).
6) Set INT TRIG to CH1 (X-Y).
7) Apply an amplitude calibration signal of 1 Vp-p from a vertical axis calibrator to the EXT input terminal.
8) Confirm that the horizontal length of the waveform on the CRT screen is about 10 DIV ±20%.
9) Set TRIG SOURCE to INT (X-Y).
10) Set the CH1 input sensitivity to 10 mV/DIV.
11) Apply an amplitude calibration signal of 100 mVp-p from a vertical axis calibrator to the CH1 input terminal.
12) Confirm that the horizontal length of the waveform on CRT screen is 10.0 ±0.4 DIV.

(2) Horizontal position check

1) Initialize the instrument according to Table 3.1.
2) Apply the signal from a time mark generator set at 1 ms to the CH1 input terminal, and adjust the sensitivity of the oscilloscope till the amplitude of the waveform observed on CRT screen becomes 2 ~ 3 DIV.
3) Turn the horizontal position dial so that the sweep starts from the left edge of the CRT screen scale.
4) Switch TIME/DIV to "X-Y or EXT HOR", and confirm that a luminant mark is observed within ±1 DIV from the center of the CRT screen.

(3) Horizontal phase and frequency characteristics check (for X-Y)

1) Initialize the instrument according to Table 3.1.
2) Set TIME/DIV to "X-Y or EXT HOR".
3) Set TRIG SOURCE to EXT.
4) Set TRIG COUPLING to DC.
5) Set VERT MODE to CH2 (X-Y).
6) Set INT TRIG to CH1 (X-Y).
7) Set the CH2 input sensitivity to 0.1 V/DIV.

8) Apply a signal of 10 kHz and 0.8 Vp-p from a signal generator to the CH2 and EXT input terminals.

9) Gradually increase the signal generator frequency, and confirm that the phase difference is within ±3° when the frequency is within 50 kHz.

10) Set TRIG SOURCE to INT (X-Y).

11) Set the CH1 input sensitivity to 0.1 V/DIV.

12) Apply a signal of 10 kHz and 0.8 Vp-p from a signal generator to the CH1 and CH2 input terminals.

13) As in step 9), gradually increase the signal generator frequency and confirm that the phase difference is within ±3° when the frequency is within 50 kHz.

14) Apply a signal of 50 kHz from the signal generator to only CH1, and adjust the signal till the amplitude on the CRT screen becomes 10 DIV.

15) Gradually increase the signal generator frequency, and confirm that the horizontal direction frequency characteristic is within –3 dB when the frequency is 1 MHz.

3.2.5 Time Base System

(1) SWEEP TIMING check

1) Initialize the instrument according to Table 4.1.

2) Apply a signal from a time mark generator to the CH1 input terminal, and switch the instrument sensitivity till the amplitude of the waveform on CRT screen becomes approximately 2 ~ 3 DIV.

3) Switch TIME/DIV and the time mark generator oscillation ranges, and confirm that the error for each sweep range is within ±3%.

4) Pull the PULL x10MAG knob, and confirm that the sweep time error for each range is within ±5% (the sweep time error for the 0.2 μ/DIV range may be within ±8%).

(2) SWEEP VARIABLE check

1) Initialize the instrument according to Table 3.1.

2) Apply a signal from a time mark generator set at 10 ms to the CH1 input terminal, and adjust the instrument input sensitivity till the amplitude of the waveform on the CRT screen becomes approximately 2 ~ 3 DIV.

3) Turn the SWEEP VARIABLE dial counterclockwise to the maximum position, and confirm that the sweep time at the maximum position is 2.5 times or more as long as that at the initial position.

3.2.6 Storage System

(1) STORAGE Check

1) Set the instrument for storage function according to table 3.1.

2) Set the "TIME/DIV" on "10 μs/DIV".

3) Connect the signal output of signal generator with CH1 input terminal with 50 kHz, and arrange the signal output as oscilloscope waveform on CRT display observed as 4 DIV.

4) Select "STORAGE/REAL" to "STORAGE".

5) Confirm the oscilloscope waveform on CRT is on Storage operation.

(2) SINE Interpolation Check

1) Set the instrument according to table 3.1.

2) Set "TIME/DIV" on "2 μs/DIV."

3) Connect the signal output of signal generator with CH1 input terminal with 10 MHz, and arrange the signal output as oscilloscope waveform on CRT display observed as 4 DIV.

4) Select "STORAGE/REAL" to "STORAGE".

5) Select "SINE/PULSE" to "SINE".

6) Confirm the oscilloscope waveform on CRT is on SINE interpolation.

(3) STORAGE SAVE Check

1) Set the instrument as per table 3.1.

2) Set "TIME/DIV" on "10 μs/DIV".

3) Connect the signal output of signal generator with CH1 input terminal with 50 kHz, and arrange the signal output as oscilloscope waveform on CRT display observed as 4 DIV.

4) Select "STORAGE/REAL" to "STORAGE".

5) Turn "SAVE" on.

6) Confirm oscilloscope waveform on CRT dipslay becomes standstill being SAVED.

(4) REFERENCE MEMORY Check

1) Set the instrument as per table 3.1.

2) Set "TIME/DIV" on "10 μs/DIV".

3) Connect the signal output of signal generator with CH1 input terminal with 50 kHz, and arrange the signal output as oscilloscope waveform on CRT display being observed as 4 DIV.

4) Select "STORAGE/REAL" to "STORAGE".

5) Turn "REF" on.

6) Confirm oscilloscope waveform on CRT display being observed standstill, with turning the vertical position of CH1.

3.3 CALIBRATION

3.3.1 General

It is needful to calibrate after a periodical use of the instrument. (Periodical Calibration)

Although it is used as inside parts of the instrument with minor changeable one, in case no calibration done for so long a time, there is some case when it could not satisfy the specifications of any part of the instrument by the accumulation of the changeability in a long time. Also, there is a case when found out either malfunction or trouble for which is out of use since the last periodical calibration.

Since it is a measurer, it works as one of a counter. And thus, the Data got by the instrument must be always read correct.

Also, in calibrating the instrument, be sure to make use of the calibrator with strictly modulated one. And together, take necessary care to the power source voltage applying to the calibrator in use.

The power voltage given in course of calibration of the instrument should be only within the range with tolerance of 100% ± 2% to the regular voltage of (100V, 115V, 215V and 230V), and with the frequency of 48 Hz ~ 62 Hz.

With the ambient temperature within the limit of 25°C ± 5°C and humidity as 60% ± 10%.

Leave the instrument fully aged before applying all those of them including this unit.

3.3.2 Table of Calibrating Gages

Table shown as 3.3 for necessary measurement gage in use for the calibration.

Measurement gage		Faculty	Remarks
Digital voltage meter (1) (for low voltage use)		Within the limit range of 0 ~ 500V Accuracy within ±0.1%	Inner power voltage check
Digital voltage meter (2) (for high voltage use)		Within the limit range of 0 ~ 10 kV Accuracy within ±1%	Accelerating voltage check
Capacity meter		Within the limit range of 0 ~ 50 pF Accuracy within ±3%	Input capacity check
Vertical axis calibrator	Calibration of amplitude	Output voltage 1 mV ~ 50 Vp-p Output accuracy within ±0.3%	Calibration of vertical axis and X-Y amplitude Square waveform about 1 kHz
	Calibration of square waveform style	Output waveform square waveform Frequency 10 Hz ~ 1 MHz Rise time less than 1.0 ns Flatness within ±0.5%	Adjusting of square waveform flatness
Time mark generator		Mark output 5 s ~ 2 ns Output stability within ±0.1%	Calibration of time base
Signel generator		Frequency range 250 kHz ~ 100 MHz Frequency accuracy within ±1% Output voltage 5 mV ~ 5.5 Vp-p Output flatness within ±2%	Calibration of vertical axis with X-Y frequency Standard of 50 kHz
Wiring connection		Specification impedance 50Ω Length about 1m	More than 2 lines
Terminal parts		Specification impedance 50Ω Power more than 1/2W	2 pieces
Attenuator		Specification impedance 50Ω Power more than 1/2W	
Screwdriver Adjusting screwdriver		For 3 m/m use For low capacity use	

Table 3.3 Measurement gage for Calibration

3.3.3 Locations of Printed Circuit Boards

Table 3-4 shows the printed circuit boards using in this unit. And, their locations are indicated in Figure 3-2.

Name of Printed Circuit Board	Remarks
A1 VERT & P. SUPPLY	
A2 SWEEP & H.V	
A3 STORAGE MODE SW	
A4 CAL & CRT CONTROL	Lower part of CRT
A5 PROCESSING UNIT	
A6 CCD TIME EXPANDER	
A7 VERT MODE SW	
A8 EXCHANGE UNIT	Attached to AC Voltage Selector

Table 3-4 List of Printed Circuit Boards

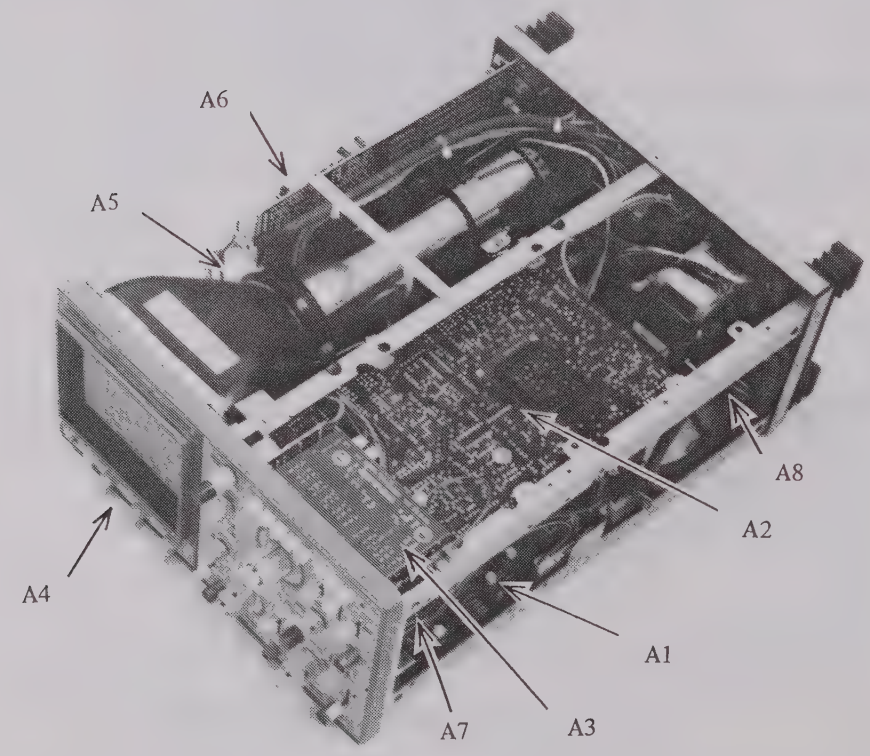


Figure 3-2 Locations of Printed Circuit Boards

3.3.4 Calibration Procedures

Calibration must properly be performed same way as to the time when this unit is manufactured. As this calibration procedure is explained the method in terms of most accurate and in minimum time expenditure, be sure to follow the steps hereafter noted.

If a partial calibration is needed and required no entire calibration, it is possible to perform only appropriate calibration, but in this case still Procedure 2) Check and Adjustment of Internal Voltage and Procedure 3) Check and Adjustment of CRT System are essential and should be completed prior to the adjustment.

1) Initial Setting

Set the knobs and switches on the unit's panel as to Table 3-5.

	Function	Set to	Remarks
Power Source	POWER	ON	
CRT System	INTEN	Sufficient brightness	2 ~ 3 o'clock position
	FOCUS	Best focus	
	ILLUM	Maximum counterclockwise position (Min)	
Vertical System	Vertical Sensitivity	10 mV/DIV	CH1, 2
	VARIABLE	CAL'D	CH1, 2
	PULL x5MAG	OFF	CH1, 2
	Input coupling	DC	CH2, 2
	POSITION	Center	CH1, 2
	VERT MODE	CH1	
	CH2 INV	OFF	
Trigger System	INT TRIG	VERT MODE	
	SOURCE	INT	
	COUPLING	AC	
	SLOPE	+	
	LEVEL	LOCK (Maximum counterclockwise position)	
	SWEEP MODE	AUTO	
Horizontal Axis System	TIME/DIV	1 ms	
	VARIABLE	CAL'D	
	PULL X10MAG	OFF	
	H POSITION	Center	
	HOLDOFF	Maximum counterclockwise position (Min)	
Storage System	STORAGE/REAL	REAL	
	SINE/PULSE	PULSE	
	SAVE	OFF	
	REF	OFF	
	PEN	OFF	

Table 3-5 Initial Setting

2) Check and Adjustment of Internal Voltage

Table shown as 3-6 for respective voltage ranges in use of this unit. And the check points of each voltage are indicated in Figures 3-3, 3-4, and 3-5.
If the voltage meets out of the range, adjust +12V ADJ (RV606) on the printed circuit board A1.

CAUTION

Because the adjustment of internal voltage affects deflection sensitivity of CRT and DC balance of each amplifier, if this adjustment is made, be sure to follow the checks hereafter.

DC power supply	Voltage range	Check, adjustment point
+5V (Analog circuit)	+4.6V ~ +5.6V	Refer to Figure 3-3
+5V (Digital circuit)	+4.5V ~ +5.5V	Refer to Figure 3-4
+12V	+11.9V ~ +12.1V	Refer to Figure 3-3, RV606
–12V	–11.7V ~ +12.3V	Refer to Figure 3-3
+145V	+136V ~ +154V	Refer to Figure 3-3
–1800V	–1700V ~ –1900V	Refer to Figure 3-5

Table 3-6 Power Supply Voltages

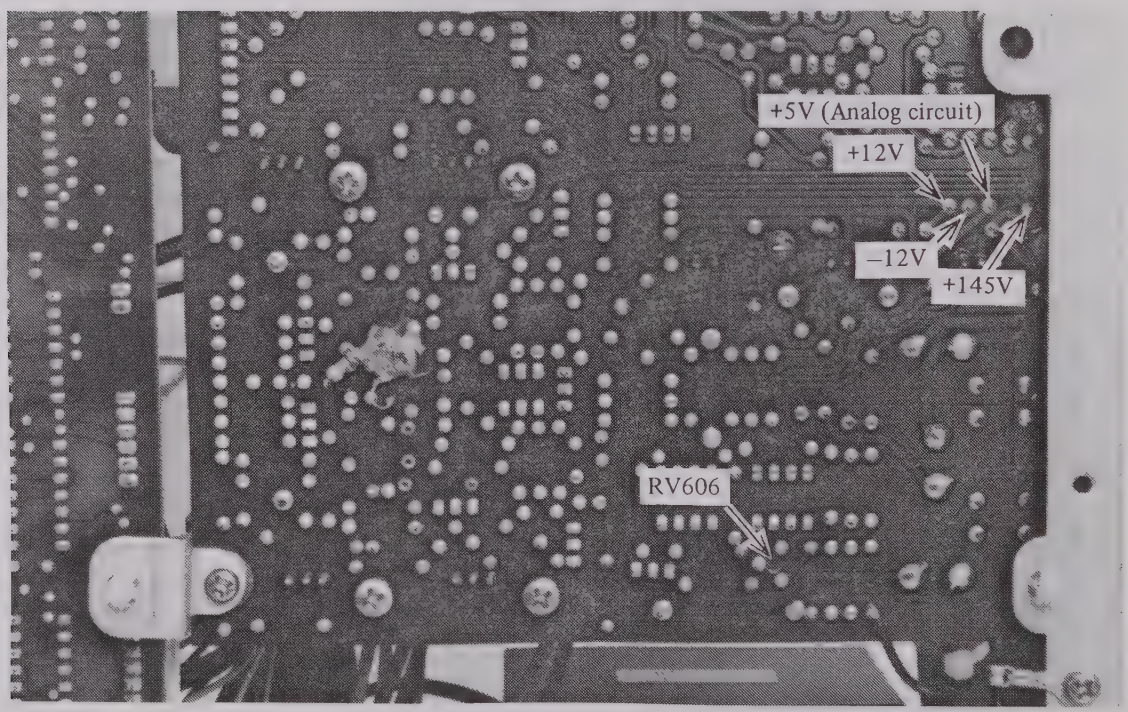


Figure 3-3 Adjustment and Check Points for Power Supply Voltage

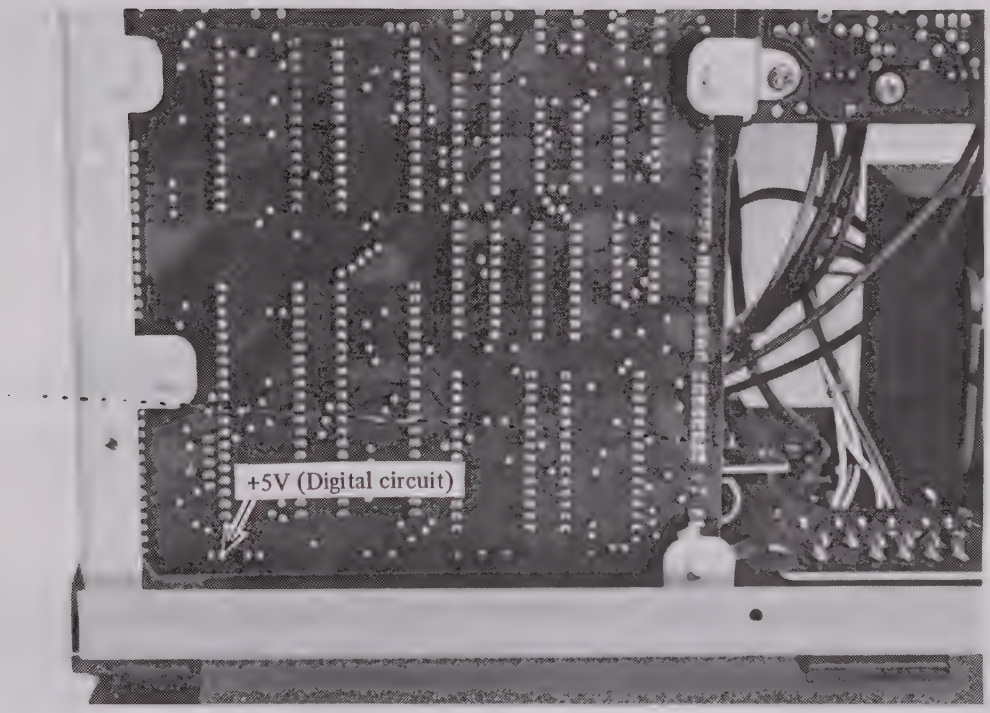


Figure 3-4 Check Point for +5V (Digital)

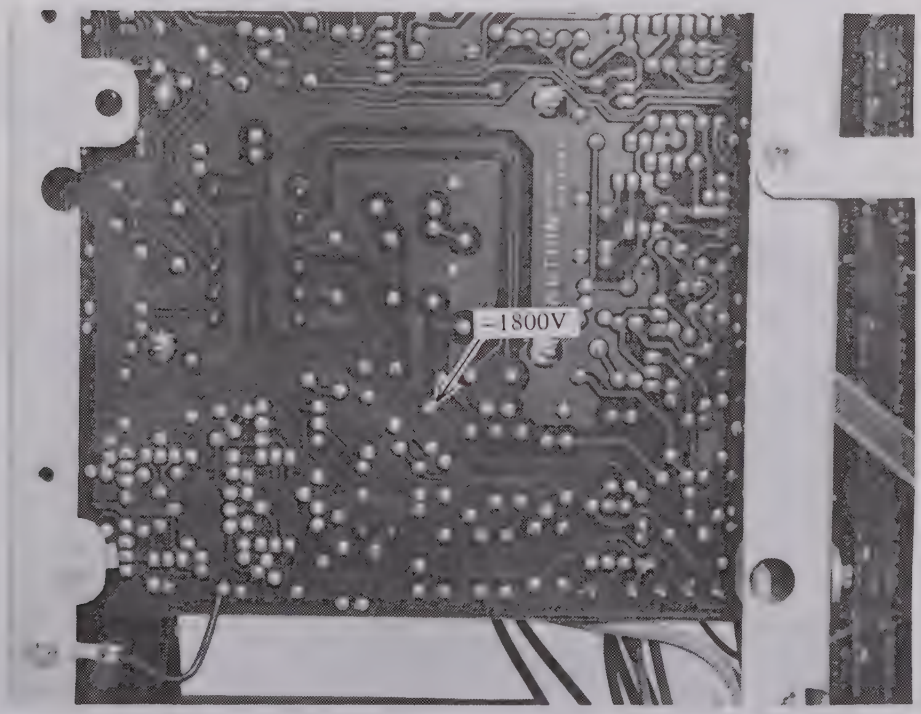


Figure 3-5 Check Point for −1800V

3) Check and Adjustment of CRT System

CAUTION

Same as to the previous Check and Adjustment of internal voltage, this adjustment also affects deflection sensitivity of CRT. If this adjustment is made, be sure to check vertical sensitivity and sweep time.

a) CRT BIAS

① Set TIME/DIV to 1 ms/DIV and obtain one horizontal line on the CRT screen.

② Set INTEN to 10 o'clock position, and confirm that a very thin horizontal line can be seen. If it is too bright or cannot be seen it, adjust CRT BIAS (RV653) on the printed circuit board A2 as indicated on Figure 3-6.

b) SUB FOCUS

Set the white mark on FOCUS to 12 o'clock position, and confirm that the proper focus is observed. When improper focus is observed at 12 o'clock position, adjust SUB FOCUS (RV651) on the printed circuit board A2.

c) ASTIG

① Set the TIME/DIV to X-Y or EXT HOR, and adjust Vertical and Horizontal POSITIONS to obtain a dot on the center of the CRT screen.

② Confirm that the dot on the screen becomes real circle when turning FOCUS appropriately. If it is not becomes near to real circle in what manner rotating FOCUS, adjust ASTIG (RV652) on the printed circuit board A2.

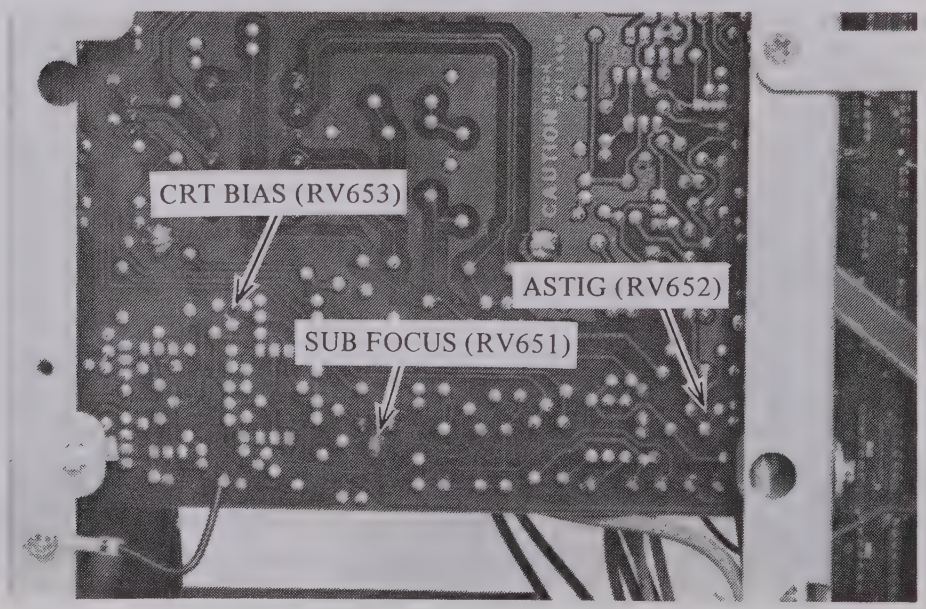


Figure 3-6 Adjustment Points for CRT System

4) Check and Adjustment of Vertical Axis

a) STEP BAL

① Set this unit as to Table 3-5 for initial setting.

② Set the CH1 input coupling to GND, and confirm that the line on the CRT screen is shifted within the range of ±0.2 DIV when the vertical sensitivity is switched as follows: 10 mV → 20 mV → 50 mV.
If the line on the CRT screen is not shifted within the range of ±0.2 DIV, adjust CH1 STEP BAL (RV101) on the printed circuit board A1.

③ Set VERT MODE to CH2, and set the CH2 input coupling to GND.

④ Same as to CH1, confirm that the line for CH2 is also shifted within the range of ±0.2 DIV when the vertical sensitivity is switched 10 mV/DIV to 5 mV/DIV.
If the line on the CRT screen is not shifted within the range of ±0.2 DIV, adjust CH2 STEP BAL (RV201) on the printed circuit board A1.

b) MAG DC Balance

① Set this unit as to Table 3-5 for initial setting.

② Set the CH1 input coupling to GND, and confirm that the line on the CRT screen is shifted within the range of ±1.0 DIV when turning ON/OFF ×5MAG (CH1).
If the line on the CRT screen is not shifted within the range of ±1.0 DIV, adjust CH1 MAG DC BAL (RV104) on the printed circuit board A1.

③ Set VERT MODE to CH2, and set the CH2 input coupling to GND.

④ Same as to CH1, confirm that the line for CH2 is also shifted within the range of ±1.0 DIV when turning ON/OFF ×5MAG (CH1). If the line on the CRT screen is not shifted within the range of ±1.0 DIV, adjust CH2 MAG DC BAL (RV204) on the printed circuit board A1.

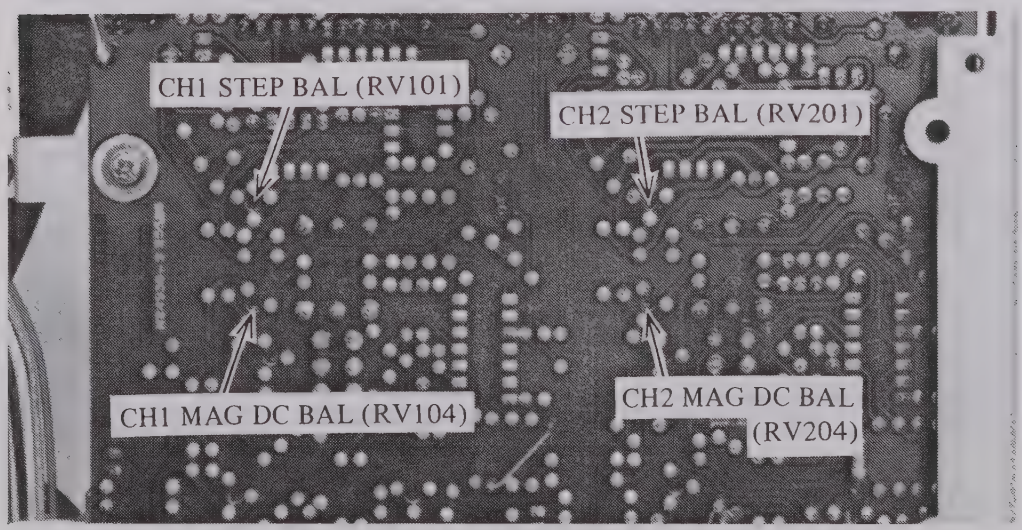


Figure 3-7 Adjustment Points for CH1/CH2 STEP BAL (RV101, RV201), CH1/CH2 MAG DC BAL (RV104, RV204)

c) DC Balance

① Set this unit as to Table 3-5 for initial setting.

② Set the CH1 input coupling to GND, and rotate VARIABLE from extremely right to extremely left. Confirm that the line on the CRT screen is shifted within the range of ±0.5 DIV.
If the line on the CRT screen is not shifted within the range of ±0.5 DIV, adjust CH1 VAR DC BAL (RV106) on the printed circuit board A1 as shown in Figure 3-8.

③ Set VERT MODE to CH2, and set CH2 input coupling to GND.

④ Same as to CH1, confirm that the line for CH2 is also shifted within the range of ±0.5 DIV.
If the line on the CRT screen is not shifted within the range of ±0.5 DIV, adjust CH2 VAR DC BAL (RV206) on the printed circuit board A1 as shown in Figure 3-8.

d) Vertical Axis Sensitivity

① Set this unit as to Table 3-5 for initial setting.

② Set TIME/DIV to 1 mV/DIV.

③ Connect 50mVp-p amplitude calibration signal from a vertical axis calibrator to CH1 input (open terminal), and confirm that the sensitivity error for 10 mV/DIV range is within the range of ±3%.
If the sensitivity error is not within the range of ±3%, adjust CH1 GAIN (RV108) on the printed circuit board A1 as shown in Figure 3-8.

④ Set VERT MODE to CH2.

⑤ Same as to CH1, confirm that the 10 mV/DIV sensitivity error for CH2 is also within the range of ±3%.
If the sensitivity error is not within the range of ±3%, adjust CH2 GAIN (RV208) on the printed circuit board A1 as shown in Figure 3-8.

e) x5 MAG Sensitivity

① Set this unit as to Table 3-5 for initial setting.

② Select input range for CH1 to 50 mV, and turn x5 MAG for CH1 on.

③ Connect a 50 mVp-p amplitude calibration signal from a vertical axis calibrator to CH1 input (open terminal), and confirm that the sensitivity error for CH1 is within the range of ±5%. If the sensitivity is not within the range of ±5% when x5 MAG is turned on, adjust CH1 x5 GAIN (RV102) on the printed circuit board A1 as shown in Figure 3-8.

④ Set VERT MODE to CH2, and connect an output signal to CH2.

⑤ Same as to CH1, confirm that the sensitivity error for CH2 is also within the range of ±5% when x5 MAG is turned on.
If the sensitivity error is not within the range of ±5% when x5 MAG is turned on, adjust CH2 x5 GAIN (RV202) on the printed circuit board A1 as shown in Figure 3-8.

f) ADD BAL

① Set this unit as to Table 3-5 for initial setting.

② Set VERT MODE to DUAL.

③ Set the lines for CH1 and CH2 exactly at the center of the CRT screen. (Place CH1 line on CH2 line.)

④ Set VERT MODE to ADD, and confirm that the line is shifted within the range of ±0.5 DIV.
If the line on the CRT screen is not shifted within the range of ±0.5 DIV, adjust ADD BAL (RV301) on the printed circuit board A1 as shown in Figure 3-8.

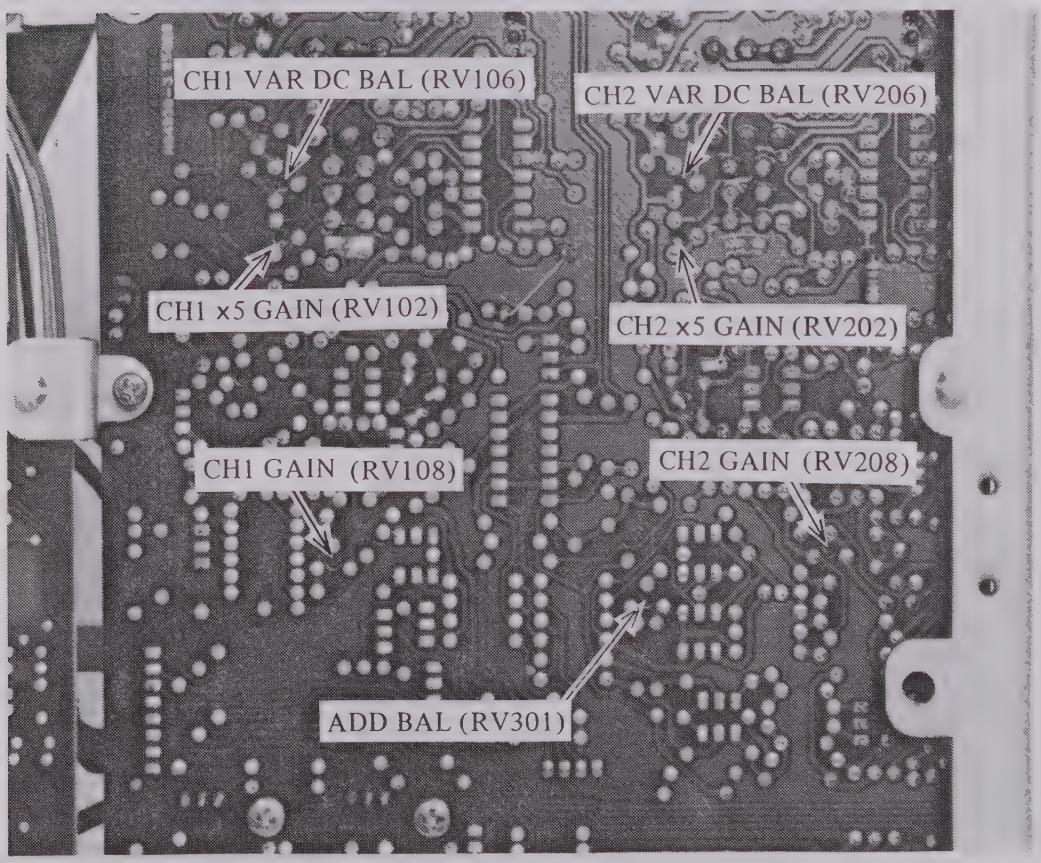


Figure 3-8 Adjustment Points for CH1/CH2 VAR DC BAL (RV106, RV206), CH1/CH2 GAIN (RV108,RV208), CH1/CH2x5 MAG (RV102, RV202) and ADD BAL (RV301)

g) Square Waveform Characteristic (Middle Range) for Vertical Axis Amplifier

① Set this unit as to Table 3-5 for initial setting.

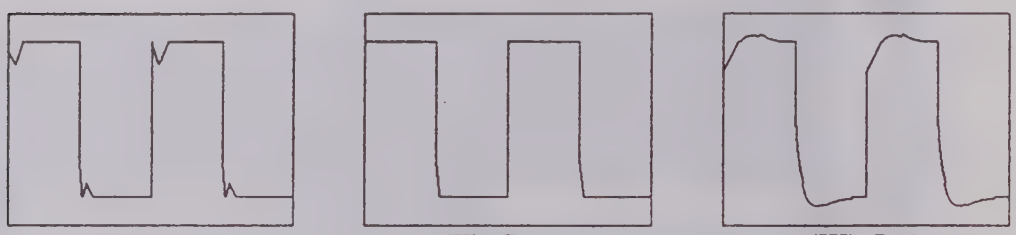
② Set CH1 sensitivity to 10 mV DIV, and set TIME/DIV to 0.2 μs/DIV.

③ Connect an approximately 1 MHz square waveform output signal from a vertical axis calibrator to CH1 input terminal (50Ω), and adjust the output signal so as the waveform on the CRT screen becomes 5 DIV.

④ Confirm that the flatness characteristic of the observed square waveform is like the one Figure 3-9 (II) shows.
If the flatness characteristic of the observed square waveform is not like the one Figure 3-9 (II) shows, adjust each other 3rd COMP (RV302, C316), and CH1 2nd COMP (RV107, C128) on the printed circuit board A1 as shown in Figure 3-10 to obtain maximum flatness of the characteristic.

⑤ After setting VERT MODE to CH2 and set sensitivity for CH2 to 10 mV/DIV, connect an output signal to CH2.

⑥ Same as to CH1, confirm that the flatness characteristic of square waveform is like the one Figure 3-9 (II) shows.
If the flatness characteristic of the observed square waveform is not like the one Figure 3-9 (II) shows, adjust CH2 2nd COMP (RV207, C228) in the same manner as to CH1 to obtain maximum flatness of the characteristic.



(I) Bad (II) Good (III) Bad

Figure 3-9 Adjustment of Flatness Characteristic for Square Waveform (Middle Range)

h) Square Waveform Characteristic (Higher Range) for Vertical Axis Amplifier

① Set this unit as to Table 3-5 for initial setting.

② Set CH1 sensitivity to 10 mV DIV, and set TIME/DIV to 0.2 μs/DIV.

③ Connect an approximately 1 MHz square waveform signal from a vertical axis calibrator to CH1 input terminal (50Ω), and adjust the output signal so as the waveform on the CRT screen becomes 5 DIV.

④ Confirm that the flatness of the observed square waveform specially for up portion (or down portion) area is very flattened.
If the flatness characteristic of the observed square waveform is not flattened specially for up or down portion, adjust CH1 1st COMP (RV103, C122) each other as shown in Figure 3-10 to obtain maximum flatness of the characteristic.

⑤ After setting VERT MODE to CH2 and set sensitivity for CH2 to 10 mV/DIV, connect an output signal to CH2.

⑥ Same as to CH1, confirm that the flatness characteristic of square waveform specially for up portion (or down portion) area is very flattened.
If the flatness characteristic of the observed square waveform is not flattened specially for up or down portion, adjust CH2 1st COMP (RV203, C222) each other as shown in Figure 3-10 to obtain maximum flatness of the characteristic.

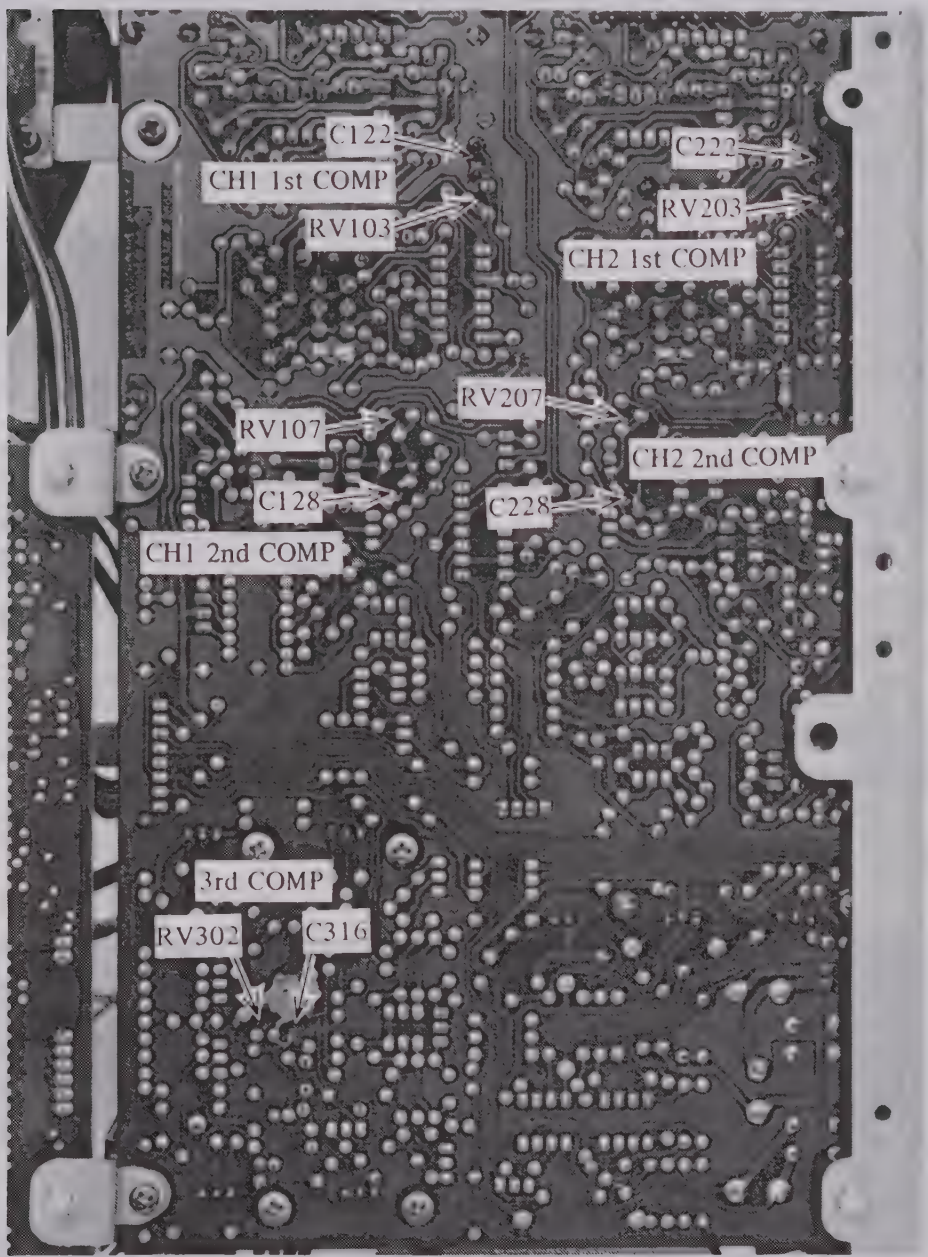


Figure 3-10 Adjustment Points for Square Waveform (Middle Range) Characteristic of Vertical Axis Amplifier

i) Input Attenuator (ATT)

① Set this unit as to Table 3-5 for initial setting.

② Set TIME/DIV to 0.5 ms/DIV, and connect an approximately 1 kHz square waveform output signal from a vertical axis calibrator to CH1 input terminal (50Ω).

③ Confirm that the flatness characteristic of the observed square waveform at 6 DIV on the CRT screen is ±3% or less at each range of CH1 input as indicated in Table 3-7.
If the flatness characteristic of square waveform is not ±3% or less, adjust phase compensator (C103, C106) for CH1 on the printed circuit board A1 as shown in Figure 3-11.

④ Set VERT MODE to CH2, and connect an output signal to CH2.

⑤ Confirm that the flatness characteristic of the observed square waveform at 6 DIV on the CRT screen is ±3% or less at each range of CH2 input as indicated in Table 3-7.
If the flatness characteristic of square waveform is not ±3% or less, adjust phase compensator (C203, C206) for CH2 on the printed circuit board A1 as shown in Figure 3-11.

⑥ Connect a capacitance analyser to CH1 input terminal.

⑦ Confirm that the input capacitance at each range of CH1 is 28 pF ± 2 pF as indicated in Table 3-7. If the input capacitance is not 28 pF ± 2 pF, adjust CH1 input capacitance (C102, C105) on the printed circuit board A1 as shown in Figure A1.

⑧ Connect the input of capacitance analyser to CH2 input terminal.

⑨ Confirm that the input capacitance at each range of CH2 is 28 pF ± 2 pF as indicated in Table 3-7. If the input capacitance is not 28 pF ± 2 pF, adjust CH2 input capacitance (C202, C205) on the printed circuit board A1 as shown in Figure 3-11.

	CH1		CH2	
	Phase Compensator	Input Capacitance	Phase Compensator	Input Capacitance
0.1V RANGE	C103	C102	C203	C202
1V RANGE	C106	C105	C206	C205

Table 3-7 Adjustment of Input Attenuator (ATT)

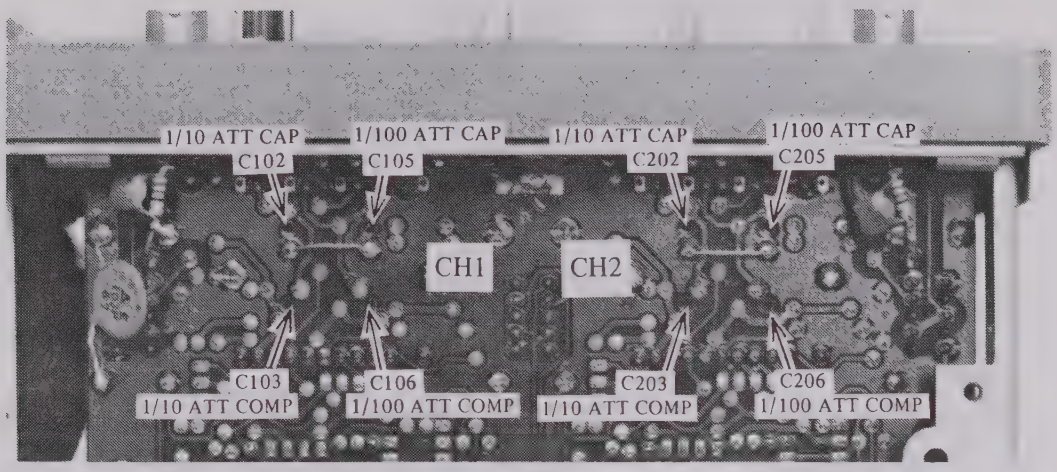


Figure 3-11 Adjustment Points for Input Attenuator (ATT)

j) CH1 SIGNAL OUTPUT DC OFFSET

CAUTION

Prior to perform this adjustment, be sure to check CH1 side of 5) Check and Adjustment of Trigger System (TRIG DC OFFSET).

① Set this unit as to Table 3-5 for initial setting.

② Set CH1 input coupling to GND, and connect output terminal of CH1 SIGNAL OUTPUT to CH2 input terminal with a coaxial cable (50Ω).

③ Set VERT MODE to CH2.

④ Confirm the line is shifted within the range of 1 DIV on the CRT screen when the input coupling of CH2 switched as follows: DC → GND → DC. If the line on the CRT screen is not shifted within the range of 1 DIV, adjust CH1 SIGNAL OUTPUT DC OFFSET (RV112) on the printed circuit board A1 as shown in Figure3-12.

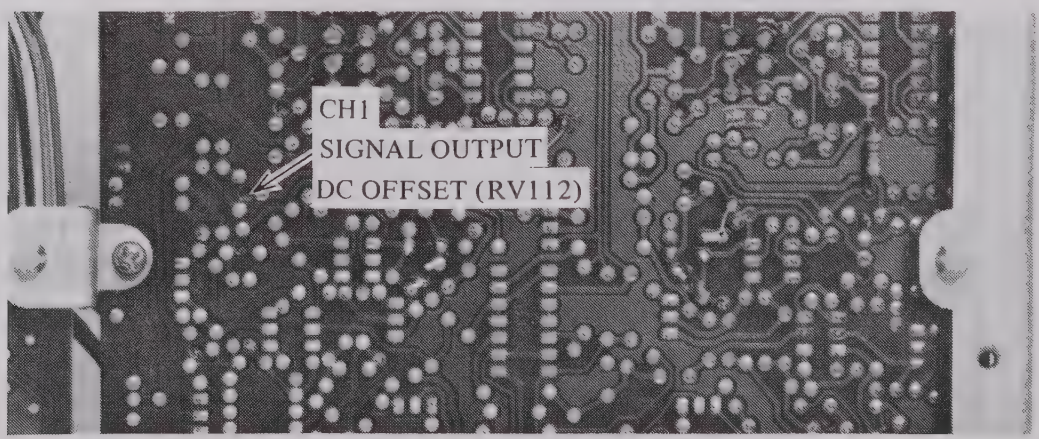


Figure 3-12 Adjustment Points for CH1 SIGNAL OUTPUT DC OFFSET

5) Check and Adjustment of Trigger System

① Set this unit as to Table 3-5 for initial setting.

② Set CH1 input coupling to AC, and set TIME/DIV to 5 μs/DIV.

③ Connect an approximately 50 kHz output of a signal generator to CH1 input, and adjust signal output so as to obtain the observed waveform becomes 8 DIV on the CRT screen.

④ Adjust TRIG LEVEL and obtain the start point of the observed waveform becomes at the center of the observed amplitude of waveform.

⑤ Switch TRIG COUPLING to DC.

⑥ Confirm that the observed waveform start point is at the center of the amplitude.
If the start point is not at the center of the amplitude, adjust CH1 TRIG & X-AXIS DC OFFSET (RV110) on the printed circuit board A1 as shown in Figure 3-13.

⑦ Set VERT MODE to CH2.

⑧ Reset CH2 input coupling to AC, and connect a signal output to CH2.

⑨ Adjust TRIG LEVEL and obtain the start point of the observed waveform becomes at the center of the observed amplitude of waveform.

⑩ Switch TRIG COUPLING to DC.

⑪ Confirm that the observed waveform start point is at the center of amplitude.
If the start point is not at the center of the amplitude, adjust CH2 TRIG DC OFFSET (RV210) on the printed circuit board A1 as shown in Figure 3-13.

6) Check and Adjust of Horizontal Axis

a) Horizontal Axis Sensitivity

① Set this unit as to Table 3-5 for initial setting.

② Set TIME/DIV to EXT HOR or X-Y.

③ Set TRIG COUPLING to DC.

④ Set VERT MODE to CH2 (X-Y).

⑤ Set INT TRIG to CH1 (X-Y).

⑥ Apply an amplitude calibration signal output of 100 mVp-p from a vertical axis calibrator to X input (CH1) (Open terminal), and confirm that the sensitivity error is within the range of ±3% at 10 mV/DIV range. If the sensitivity error is not within the range of ±3%, adjust X-GAIN (RV109) on the printed circuit board A1 as shown in Figure 3-13.

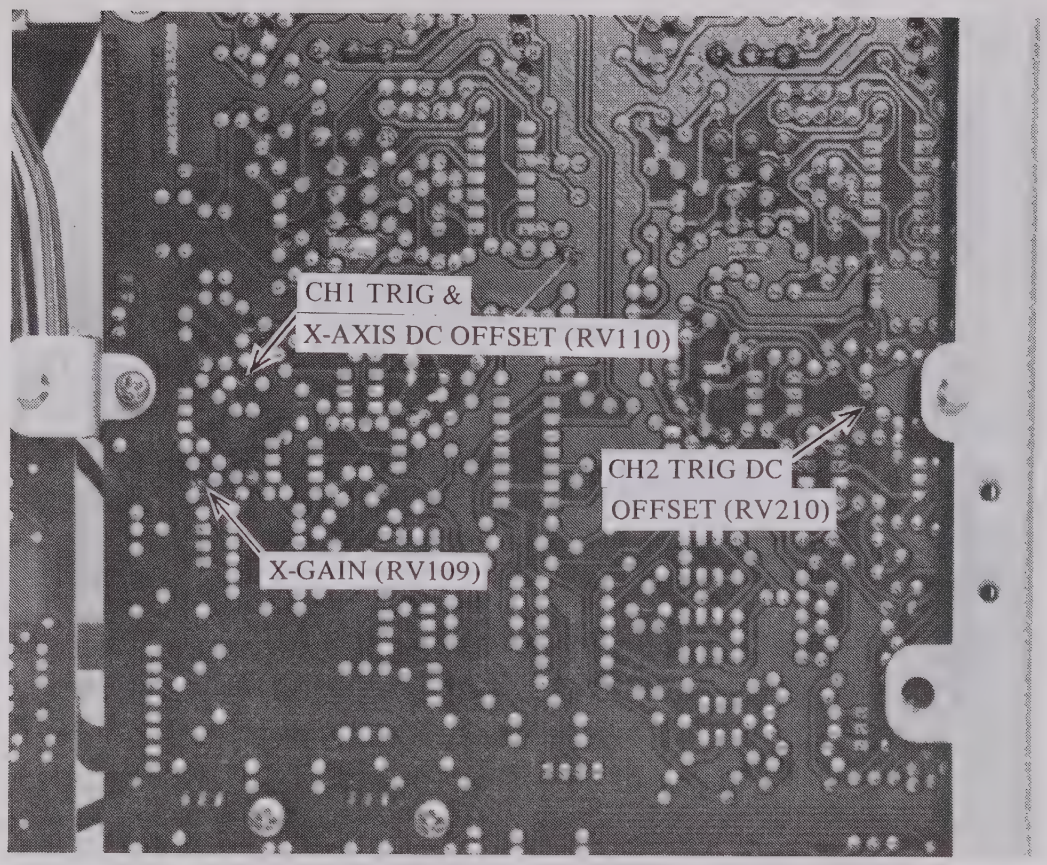


Figure 3-13 Adjustment Points for INT TRIG DC OFFSET (RV110, RV210) X-GAIN (RV109)

b) X-Y Position

① Set this unit as to Table 3-5 for initial setting.

② Adjust H POSITION and set the start point of A sweep at the left end of the scale on the CRT screen.

③ Set TIME/DIV to EXT HOR or X-Y.

④ Set TRIG COUPLING to DC.

⑤ Set VERT MODE to CH2 (X-Y).

⑥ Set INT TRIG to CH1 (X-Y).

⑦ Confirm that the line is within the range of ±1 DIV at the center of the CRT screen.
If the beam spot is not found at the center of CTR screen ±1 DIV, adjust the X AXIS DC OFFSET control (RV401) on the A2 board in Figure 3-14.

c) Sweep Time

① Set this unit as to Table 3-5 for initial setting.

② Apply an 1 ms signal output of a time marker (50Ω), and adjust the input sensitivity of this unit to obtain the observed waveform becomes 2 to 3 DIV on the CRT screen.

③ Confirm that the displayed cycle of the observed waveform on the CRT screen is within the range of ±3%. If the displayed cycle of the observed waveform is not within the range of ±3%, adjust 1 ms ADJ (RV403) on the printed circuit board A2 as shown in Figure 3-14.

④ Set a cycle of the time marker signal to 1 μs.

⑤ Set TIME DIV to 1 μs/DIV.

⑥ Confirm that the displayed cycle of the observed waveform on the CRT screen is within the range of ±3%. If the displayed cycle of the observed waveform is not within the range of ±3%, adjust 1 μs ADJ (RV402) on the printed circuit board A2 as shown in Figure 3-14.

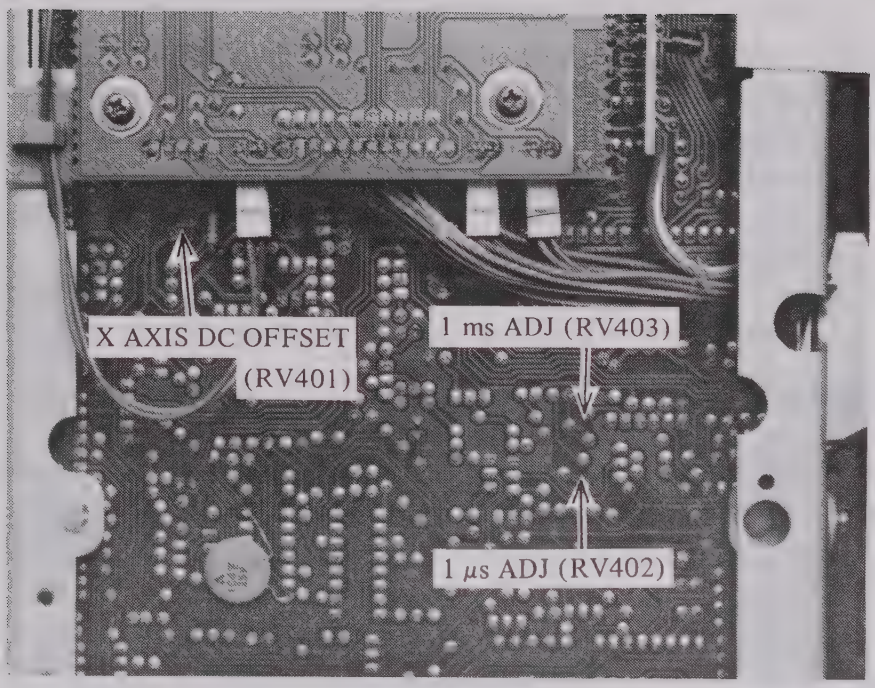


Figure 3-14 Adjustment Points for X AXIS DC OFFSET (RV401) 1ms ADJ (RV403) and 1μs ADJ (RV402)

* ignore what picture above shows as adjustments for 1mS/1μS Timing. They are opposite - RV402 is 1mS adjust, RV403 is 1μS adjust.

7) Check and Adjustment of Storage System

CAUTION

Before attempting the Check and Adjustment of Storage System, ascertain that the Check and Adjustment of Real Time System is completed. If the Check and Adjustment of Real Time System is not finished, complete this Check and Adjustment and perform the Storage Adjustment.

a) Displaying of Waveform for Servicing

① Set this unit as to Table 3-5 for initial setting.

② Set STORAGE/REAL to STORAGE.

③ The CRT screen displays the waveform for servicing as illustrated in Figure 3-15 when shorting P90 connector on the printed circuit board A5 as shown in Figure 3-16.

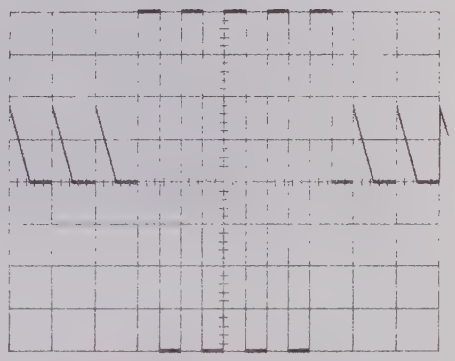


Figure 3-15 Waveform for Servicing

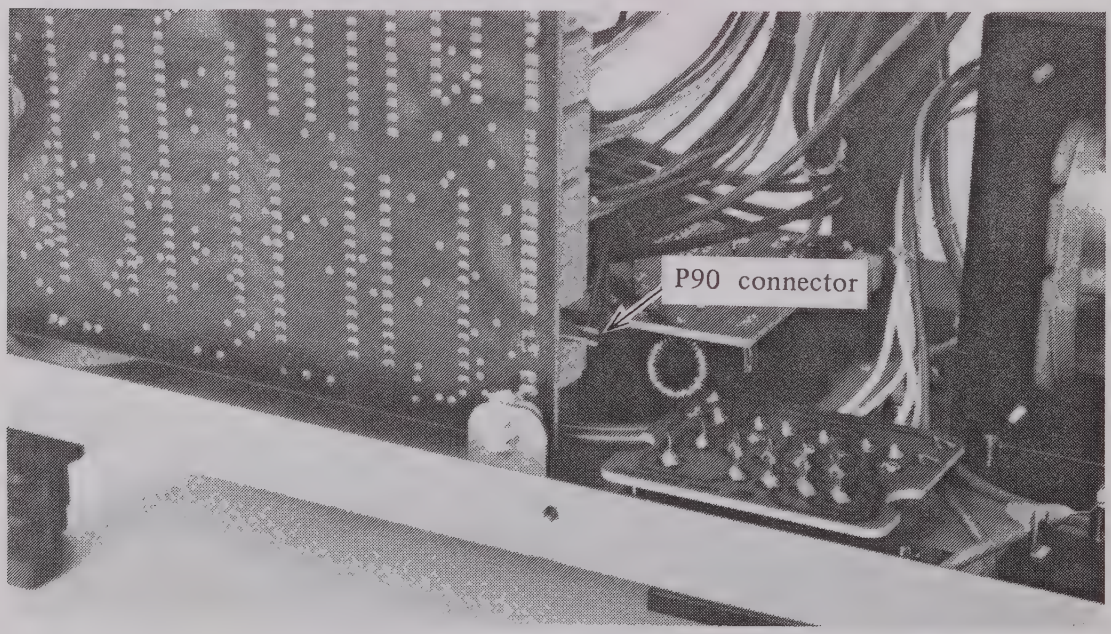


Figure 3-16 Location of P90 Connector

b) Adjustment of D/A OFFSET

① Display Figure 3-17 waveform for servicing on the screen.

② Confirm that the vertical direction of the waveform for servicing is placed at the center of the CRT screen as shown in Figure 3-17. If the vertical direction of the waveform for servicing is not placed at the center of the CRT screen, adjust D/A OFFSET (RV802) on the printed circuit board A5 as shown in Figure 3-18.

c) Adjustment of D/A GAIN

① Display the waveform for servicing on the screen.

② Confirm that the amplitude of square waveform included in the waveform for servicing is within the range of 8 DIV ± 0.1 DIV as shown in Figure 3-17. If the amplitude of square waveform is not within the range of 8 DIV ± 0.1 DIV, adjust D/A GAIN (RV804) on the printed circuit board A5 as shown in Figure 3-18.

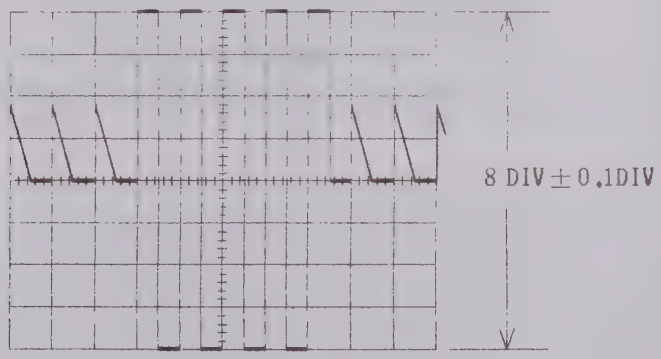


Figure 3-17 Waveform for Servicing (D/A Adjustment)

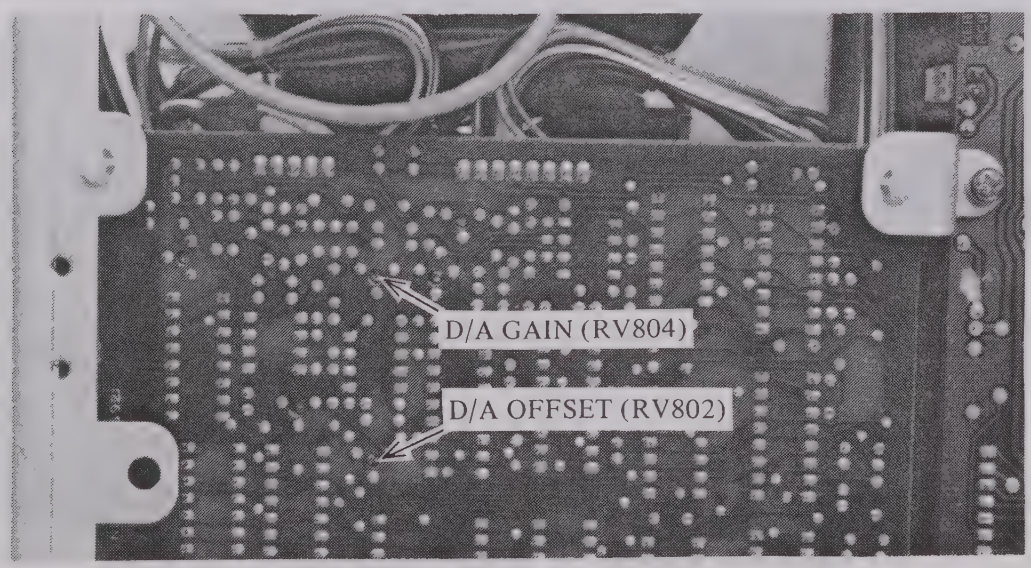
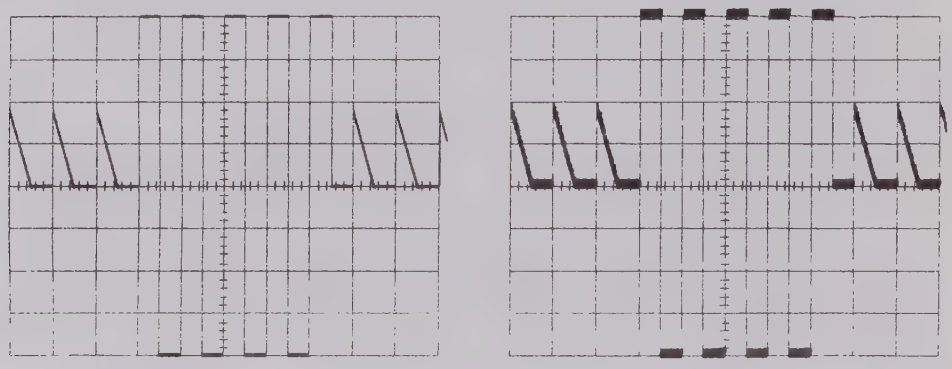


Figure 3-18 Adjustment Points for D/A OFFSET (RV802), D/A GAIN (RV804)

d) Dot Joint Balance

① Display Figure 3-15 waveform for servicing on the screen.

② Confirm that the line of the waveform for servicing is not included the other signals and cleaned as Figure 3-19 (A). If the line of the waveform is included the other signals as Figure 3-19 (B), adjust DOT JOINT BAL (RV805) on the printed circuit board A5 as shown in Figure 3-21.



(A) (B)

Figure 3-19 Waveform for Servicing (Dot Joint Balance Adjustment)

e) High Frequency Compensation

① Display Figure 3-20 waveform for servicing on the screen.

② Confirm that the higher range characteristic of the square waveform in the waveform for servicing is flattened. If the higher range is not flattened, adjust HIGH FREQUENCY COMP (RV803) on the printed circuit board A5 as shown in Figure 3-21.

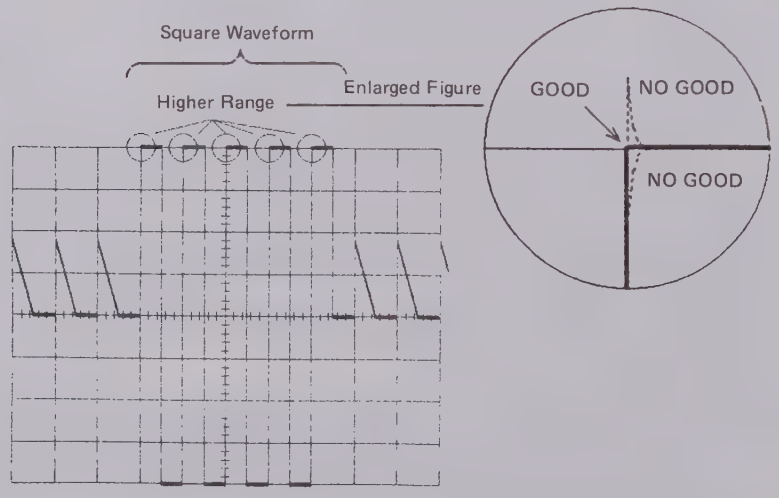


Figure 3-20 Waveform for Servicing (Higher Range Adjustment)

f) Sweep Start

① Set this unit as to Table 3-5 for initial setting.

② Set VERT MODE to CH2, and CH2 input coupling to GND.

③ Rotate H POSITION and place the start point of the sweep at the left end of the scale on the CRT screen.

④ Display Figure 3-20 waveform for servicing on the screen.

⑤ Confirm that the start point of the sweep is placed within the range of ±0.2 DIV to the left end of the scale as shown in Figure 3-20. If the start point is not placed within the range of ±0.2 DIV to the left end of the scale, adjust SWEEP START (RV801) on the printed circuit board A5 as shown in Figure 3-21.

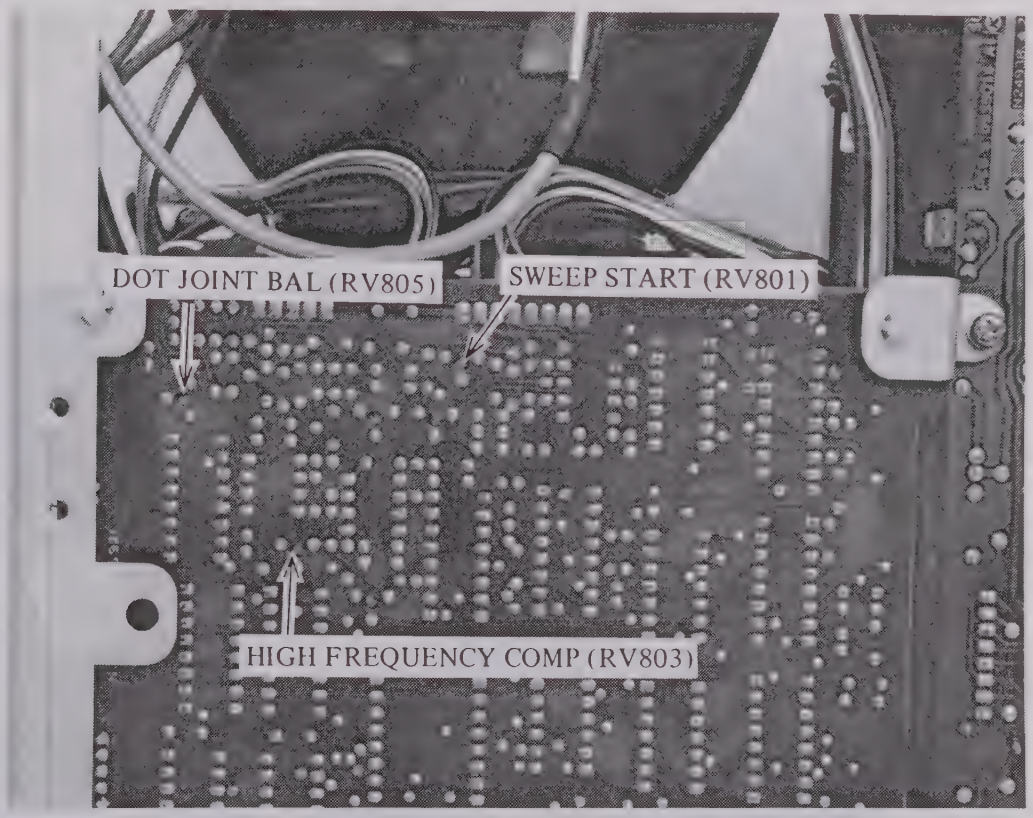


Figure 3-21 Adjustment Point for DOT JOINT BAL (RV805)
HIGH FREQUENCY COMP (RV803) SWEEP START (RV801)

g) Adjustment of Sweep Gain

① Display Figure 3-22 waveform for display on the screen.

② Confirm that the 2nd and 10th (1st DIV and 9th DIV) of the up portion in the waveform for servicing are within the range of ±0.1 DIV to the scale. If the 2nd and 10th ones are not within the range of ±0.1 DIV, adjust SWEEP GAIN (RV800) on the printed circuit board A5 as shown in Figure 3-23.

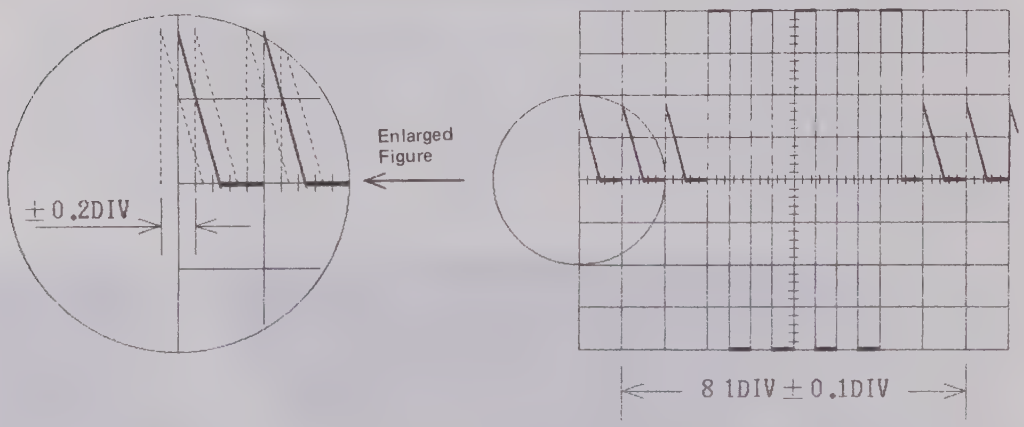


Figure 3-22 Waveform for Servicing (Adjustment of Sweep)

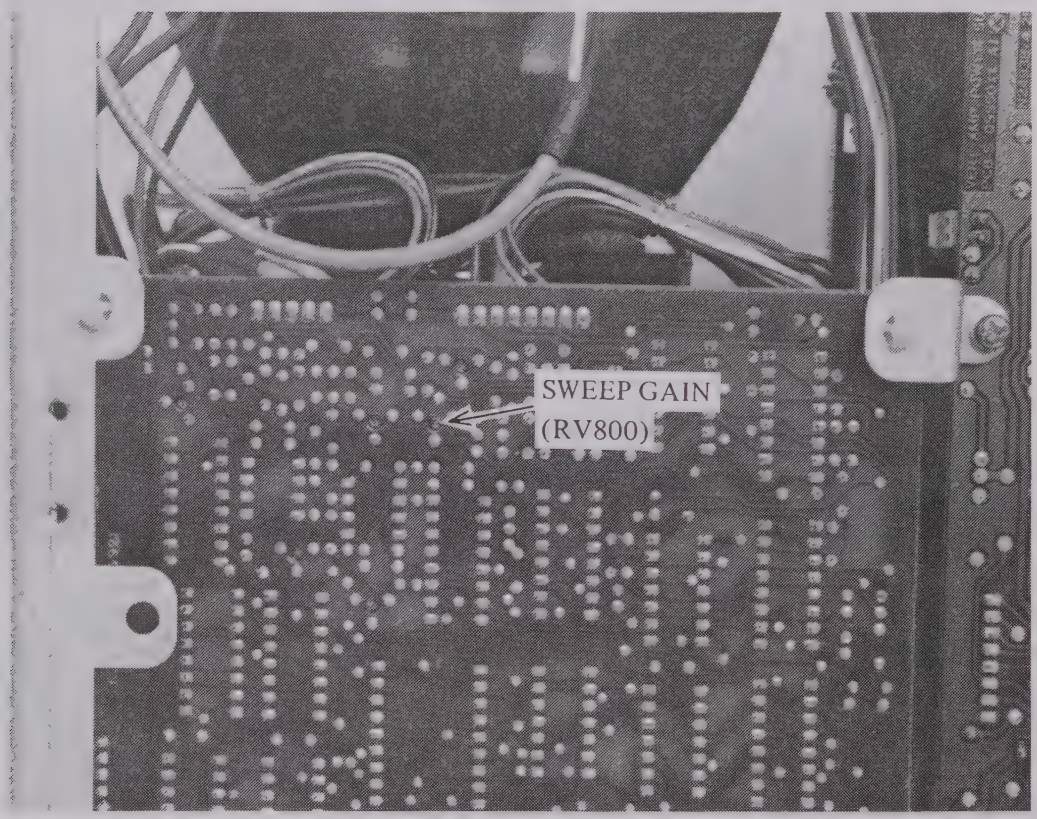


Figure 3-23 Adjustment Point for SWEEP GAIN (RV800)

h) CCD Bias and Gain

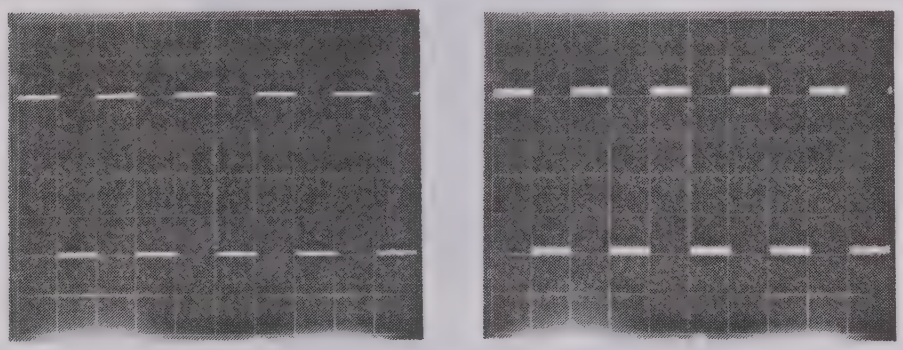
① Set this unit as to Table 3-5 for initial setting.

② Set STORAGE/REAL to STORAGE.

③ Set TIME/DIV to 50 μs/DIV, and set CH1 input sensitivity to 10 mV/DIV.

④ Apply an approximately 10 kHz output signal from a vertical axis calibrator to CH1 input (50Ω). Adjust the vertical position and output signal of this unit, and obtain the observed waveform on the CRT screen becomes 4 DIV.

⑤ Confirm that the thickness of the horizontal line of the observed waveform is within the range of 0.1 to 0.2 DIV as shown in Figure 3-24 (A). If the thickness of the line is not within the range of 0.1 to 0.2 DIV and exceeded 0.2 DIV with an oscillation signal as indicated in Figure 3-24 (B), adjust CCD BIAS ADJ (1) and (2) (RV903, RV904) on the printed circuit board A6 as shown in Figure 3-25.



(A) (B)

Figure 3-24 Adjustment of CCD Bias (1)

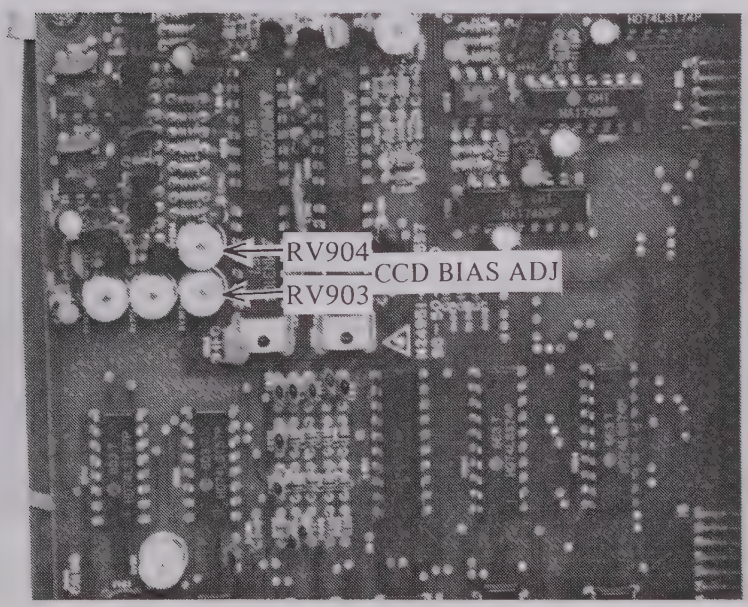


Figure 3-25 Adjustment Points for CCD BIAS ADJ (1) and (2) (RV903, RV904)

⑥ Turn the vertical position to shift the observed waveform upward or downward of the CRT screen. (Refer to Figure 3-26.) Confirm that the thickness of the observed horizontal line is within the range of 0.1 to 0.2 DIV at all the observing places of the CRT screen. If the thickness of the observed waveform is more than 0.2 DIV with an oscillation signal, adjust CCD BIAS ADJ (3) and (4) (RV905, RV906) on the printed circuit board A6 as shown in Figure 3-29. And, the same method of adjusting CCD BIAS ADJ (3) and (4) (RV905, RV906) as shown in Figure 3-28 is also applied to the cases when shifting the observed waveform upward or downward and obtain the edge portion characteristic of the observed square waveform is too drooped or lifted too much.

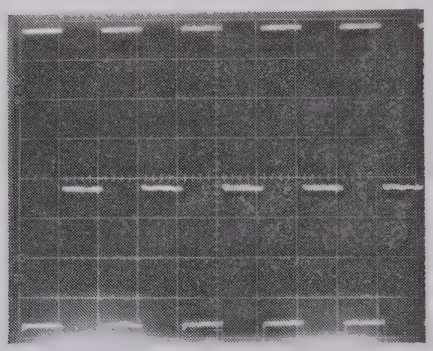


Figure 3-26 Adjustment of CCD Bias (2)

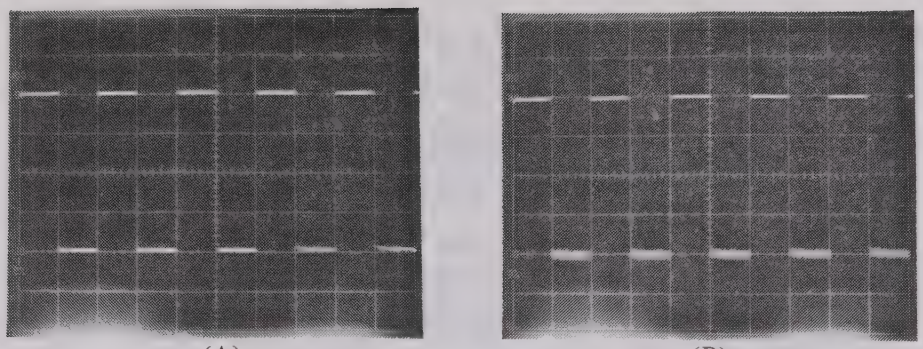
⑦ Set STORAGE/REAL to REAL.

⑧ Adjust the output signal so as to obtain the amplitude of the observed waveform injected to CH1 becomes 4 DIV ± 0.1 DIV.

⑨ Set STORAGE/REAL to STORAGE.

⑩ Confirm that the amplitude of the waveform injected to CH1 is within the range of 4 DIV ± 0.1 DIV as shown in Figure 3-27 (A). If the amplitude of the observed waveform is not within the range of 4 DIV ± 0.1, or either side of the plus (+) or the minus (–) of the horizontal line is thickened as indicated in Figure 3-27 (B), adjust CCD GAIN ADJ (1) and (2) (RV907, RV908) on the printed circuit board A6 as shown in Figure 3-28.

⑪ Confirm that the thickness of the horizontal line is less than 0.2 DIV. If the line thickness is more than 0.2 DIV, adjust CCD BALANCE (RV909) on the printed circuit board A6 as shown in Figure 3-28.



(A) (B)

Figure 3-27 Adjustment of CCD GAIN

⑫ Set TIME/DIV to 0.1 ms/DIV.

⑬ Set STORAGE REAL to REAL.

⑭ After confirming the amplitude of the observed signal at the real time is within the range of 4 DIV ± 0.1 DIV, set STORAGE/REAL to STORAGE.

⑮ Confirm that the amplitude of the observed signal at the storage is within the range of 4 DIV ± 0.1 DIV. If the amplitude of the observed signal is not within the range of 4 DIV ± 0.1 DIV, adjust CCD GAIN ADJ (0.1 ms) (RV901) on the printed circuit board A6 as shown in Figure 3-32.

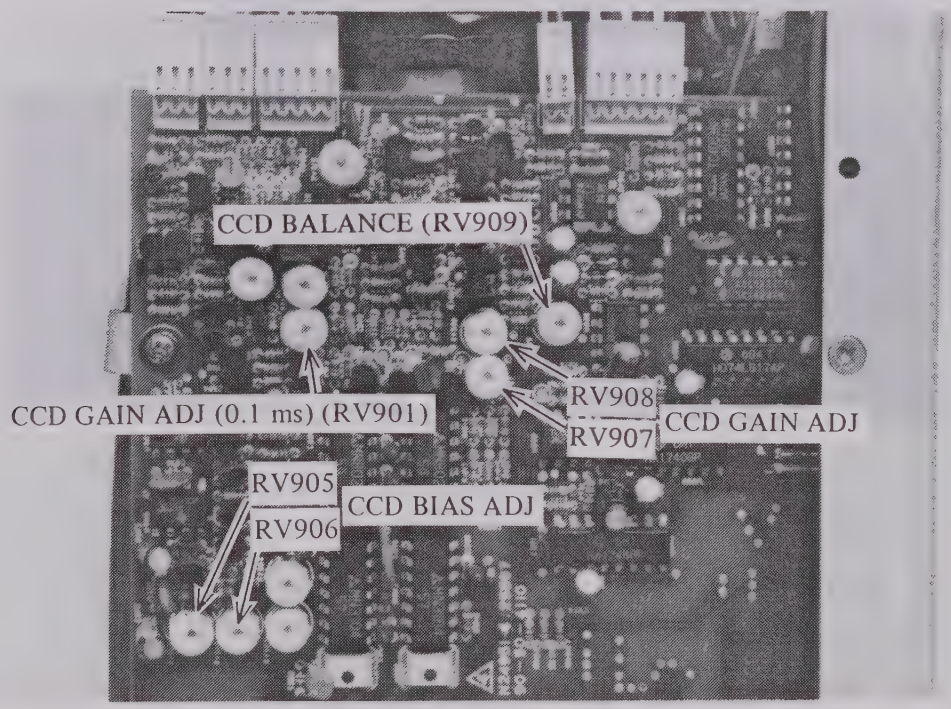


Figure 3-28 Adjustment Points for CCD BIAS ADJ (3) and (4) (RV905, RV906)
CCD GAIN ADJ (1) and (2) (RV907, RV908), CCD BALANCE (RV909)
CCD GAIN ADJ (0.1ms) (RV901)

i) CCD Linearity

① Set this unit as to Table 3-5 for initial setting.

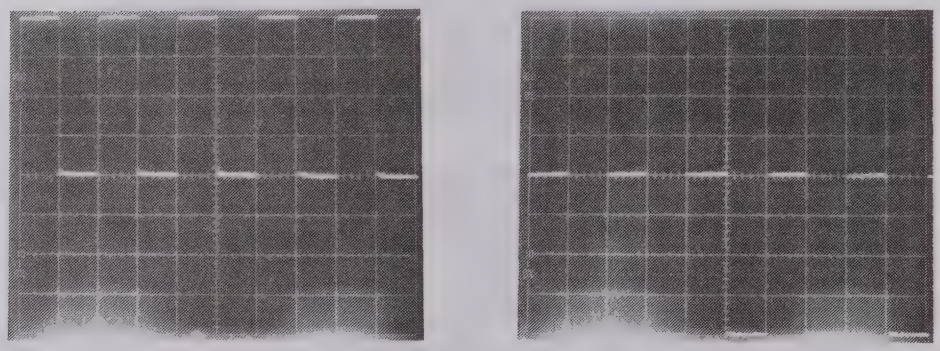
② Set STORAGE/REAL to STORAGE.

③ Set TIME/DIV to 50 μs/DIV, and set the input sensitivity of CH1 to 10 mV/DIV.

④ Apply an approximately 10 kHz output signal from a vertical axis calibrator to CH1 input (50Ω), and obtain the observed waveform on the CRT screen becomes 4 DIV.

⑤ Rotate the vertical position and place the observed waveform on the upper half of the CRT screen as Figure 3-29 (A) shows, and confirm that the amplitude of the observed signal is within the range of 4 DIV ± 0.1 DIV. If the amplitude of the observed signal is not within the range of 4 DIV ± 0.1 DIV, adjust CCD LINEARITY (RV912) on the printed circuit board A6 as shown in Figure 3-30.

⑥ Rotate the vertical position and place the observed waveform on the lower half of the CRT screen as Figure 3-29 (B) shows, and confirm that the amplitude of the observed signal is within the range of 4 DIV ± 0.1 DIV. If the amplitude of the observed signal is not within the range of 4 DIV ± 0.1 DIV, adjust CCD LINEARITY (RV912) on the printed circuit board A6 to satisfy the amplitude within the range of 4 DIV ± 0.1 DIV to the extent when the observed signal is on the upper half of the screen as shown in Figure 3-30.



(A) (B)

Figure 3-29 Adjustment of CCD Linearity

j) Storage Offset

① Set this unit as to Table 3-5 for initial setting.

② Set the input coupling of CH1 to GND, and display an one horizontal line on the CRT screen.

③ Adjust vertical position to set the line on the center of the CRT screen.

④ Confirm that the shift of the line is within the range of ±0.2 DIV when switching STORAGE/REAL alternately. (Be sure to check the time axis that is 1 ms/DIV.)
If the shift of is not within the range of 0.2 DIV, adjust STORAGE OFFSET (1 ms) (RV902) on the printed circuit board A6 as shown in Figure 3-30.

⑤ Switch TIME/DIV from 1 ms/DIV to 50 μs/DIV.

⑥ Confirm that the shift of the line is within the range of ±0.2 DIV when switching STORAGE/REAL alternately.
If the shift of the line is not within the range of ±0.2 DIV, adjust STORAGE OFFSET (50 μs) (RV910) on the printed circuit board A6 as shown in Figure 3-30.

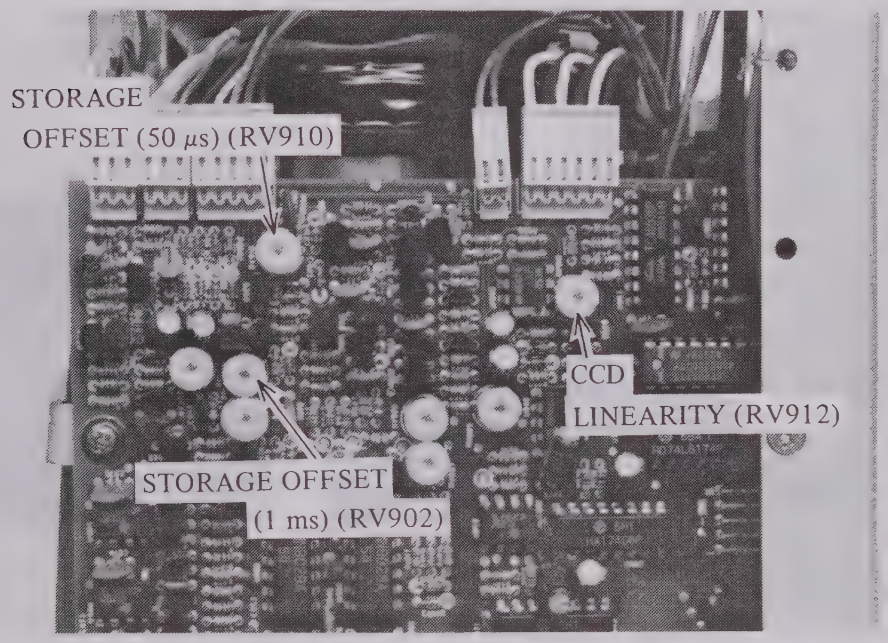


Figure 3-30 Adjustment Points for STORAGE OFFSET (1 ms) (RV902) and STORAGE OFFSET (50 μs) (RV910), CCD LINEARITY (RV912)

k) Clock Timing

① Set this unit as to Table 3-5 for initial setting.

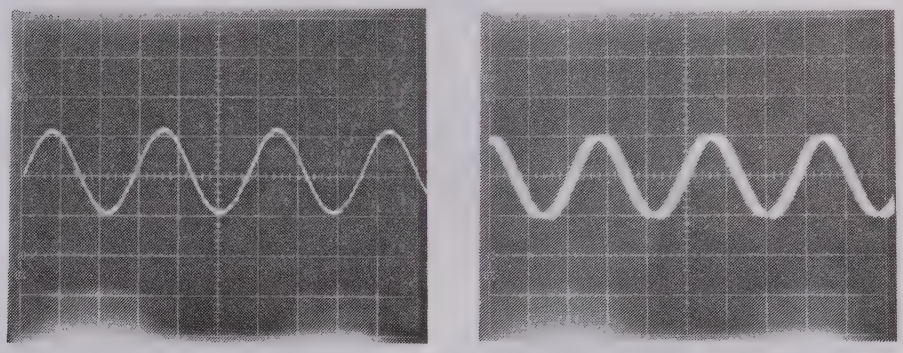
② Change TIME/DIV from 1 ms/DIV to 2 μs/DIV.

③ Switch STORAGE/REAL to STORAGE.

④ Release LEVEL LOCK of LEVEL, and turn to maximum clockwise.

⑤ Apply an approximately 25.2 MHz output signal from a signal generator, and adjust the output signal so to obtain the observed waveform becomes approximately 2 DIV on the screen. (The state of the waveform on the screen is not synchronized jittery.

⑥ Confirm that the observed waveform on the screen is a illustrated sine wave as to Figure 3-31 (A). (In this case the form is important, and the cycle is not so important.)
If the observed waveform is not such a sine wave like Figure 3-31 (A) shows, and resemble to the waveform included the signal as Figure 3-31 (B) shows, adjust CLOCK TIMING (RV911) on the printed circuit board A6 as shown in Figure 3-32.



(A) (B)

Figure 3-31 Adjustment of Clock Timing

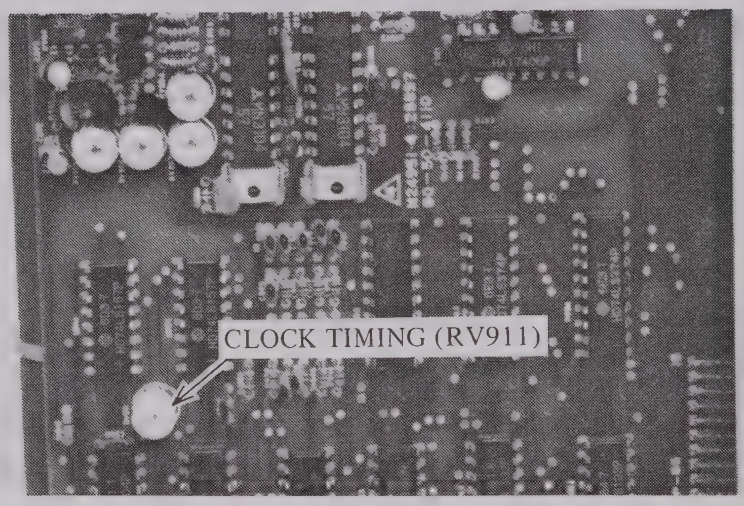


Figure 3-32 Adjustment Point for CLOCK TIMING (RV911)

3.3.5 Location of Adjustment Parts

The list of adjustment parts required for this unit alignment are on Table 3-8 and Table 3-9, and these parts location are listed separately by printed circuit board in Figures 3-33, 3-34, 3-35 and 3-36.

No.	Item	Name of Adjustment	Circuit No.	P.C. Board
1	Adjustment of Supply Voltage	+12V ADJ	RV606	A1
2	Adjustment of SUB INTEN	CRT BIAS	RV653	A2
3	Adjustment of SUB FOCUS	SUB FOCUS	RV651	A2
4	Adjustment of ASTIG	ASTIG	RV652	A2
5	Adjustment of Vertical Axis DC BALANCE	CH1 STEP BAL	RV101	A1
6	Adjustment of Vertical Axis DC BALANCE	CH2 STEP BAL	RV201	A1
7	Adjustment of Vertical Axis DC BALANCE	CH1 MAG DC BAL	RV104	A1
8	Adjustment of Vertical Axis DC BALANCE	CH2 MAG DC BAL	RV204	A1
9	Adjustment of Vertical Axis DC BALANCE	CH1 VAR DC BAL	RV106	A1
10	Adjustment of Vertical Axis DC BALANCE	CH2 VAR DC BAL	RV206	A1
11	Adjustment of Vertical Axis Sensitivity	CH1 GAIN	RV108	A1
12	Adjustment of Vertical Axis Sensitivity	CH2 GAIN	RV208	A1
13	Adjustment of Vertical Axis Sensitivity (x5 MAG)	CH1 x5 GAIN	RV102	A1
14	Adjustment of Vertical Axis Sensitivity (x5 MAG)	CH2 x5 GAIN	RV202	A1
15	Adjustment of Vertical Axis DC BALANCE	ADD BAL	RV301	A1
16	Vertical Axis Square Waveform Characteristic (Middle Range)	COMP(M) ADJ	RV302	A1
17	Vertical Axis Square Waveform Characteristic (Middle Range)	COM(M) ADJ	C361	A1
18	Vertical Axis Square Waveform Characteristic (Middle Range)	CH1 COMP(M) ADJ	RV107	A1
19	Vertical Axis Square Waveform Characteristic (Middle Range)	CH1 COMP(M) ADJ	C128	A1
20	Vertical Axis Square Waveform Characteristic (Middle Range)	CH2 COMP(M) ADJ	RV207	A1
21	Vertifcal Axis Square Waveform Characteristic (Middle Range)	CH2 COMP(M) ADJ	C228	A1
22	Vertical Axis Square Waveform Characteristic (Middle Range)	CH1 COMP(H) ADJ	RV103	A1
23	Vertical Axis Square Waveform Characteirstic (Middle Range)	CH1 COMP(H) ADJ	C122	A1
24	Vertical Axis Square Waveform Characteristic (Middle Range)	CH2 COMP(H) ADJ	RV203	A1
25	Vertical Axis Square Waveform Characteristic (Middle Range)	CH2 COMP(H) ADJ	C222	A1
26	Adjustment of Input Attenuator (ATT)	CH1 1/10 ATT COMP	C103	A1
27	Adjustment of Input Attenuator (ATT)	CH1 1/100 ATT COMP	C106	A1
28	Adjustment of Input Attenuator (ATT)	CH2 1/10 ATT COMP	C203	A1
29	Adjustment of Input Attenuator (ATT)	CH2 1/100 ATT COMP	C206	A1
30	Adjustment of Input Attenuator (ATT)	CH1 1/10 ATT CAP	C102	A1
31	Adjustment of Input Attenuator (ATT)	CH1 1/100 ATT CAP	C105	A1
32	Adjustment of Input Attenuator (ATT)	CH2 1/10 ATT CAP	C202	A1
33	Adjustment of Input Attenuator (ATT)	CH2 1/100 ATT CAP	C205	A1
34	Adjustment of DC OFFSET for CH1 Output Signal	CH1 SIGNALOUT DC OFFSET	RV112	A1

Table 3-8 List of Adjustment Parts (Part 1)

No.	Item	Name of Adjustment	Circuit No.	P.C. Board
35	Adjustment of Internal Trigger DC OFFSET	CH1 TRIG & X-AXIS DC OFFSET	RV110	A1
36	Adjustment of Internal Trigger DC OFFSET	CH2 TRIG DC OFFSET	RV210	A1
37	Adjustment of Horizontal Axis	X-GAIN	RV109	A1
38	Adjustment of X-Y Position	X AXIS DC OFFSET	RV401	A2
39	Adjustment of Time Axis (A Sweep)	1 ms CAL	RV403	A2
40	Adjustment of Time Axis (A Sweep)	1 μs CAL	RV402	A2
41	Adjustment D/A OFFSET	D/A OFFSET	RV802	A5
42	Adjustment of D/A GAIN	D/A GAIN	RV804	A5
43	Adjustment of DOT JOINT	DOT JOINT BAL	RV805	A5
44	Adjustment of Frequency Response for D/A	HIGH FREQUENCY COMP	RV803	A5
45	Adjustment of SWEEP START	SWEEP START	RV801	A5
46	Adjustment of SWEEP GAIN	SWEEP GAIN	RV800	A5
47	Adjustment of CCD BIAS	CCD BIAS ADJ (1)	RV903	A6
48	Adjustment of CCD BIAS	CCD BIAS ADJ (2)	VR904	A6
49	Adjustment of CCD BIAS	CCD BIAS ADJ (3)	RV905	A6
50	Adjustment of CCD BIAS	CCD BIAS ADJ (4)	RV906	A6
51	Adjustment of CCD GAIN	CCD GAIN ADJ (1)	RV907	A6
52	Adjustment of CCD GAIN	CCD GAIN ADJ (2)	RV908	A6
53	Adjustment of CCD BALANCE	CCD BALANCE	RV909	A6
54	Adjustment of CCD GAIN (0.1 ms)	CCD GAIN ADJ (0.1 ms)	RV901	A6
55	Adjustment of CCD LINEARITY	CCD LINERITY	RV912	A6
56	Adjustment of OFFSET (STORAGE)	STORAGE OFFSET (1 ms)	RV902	A6
57	Adjustment of OFFSET (STORAGE)	STORAGE OFFSET (50 μs)	RV910	A6
58	Adjustment of CLOCK TIMMING	CLOCK TIMMING	RV911	A6

Table 3-9 List of Adjustment Parts (Part 2)

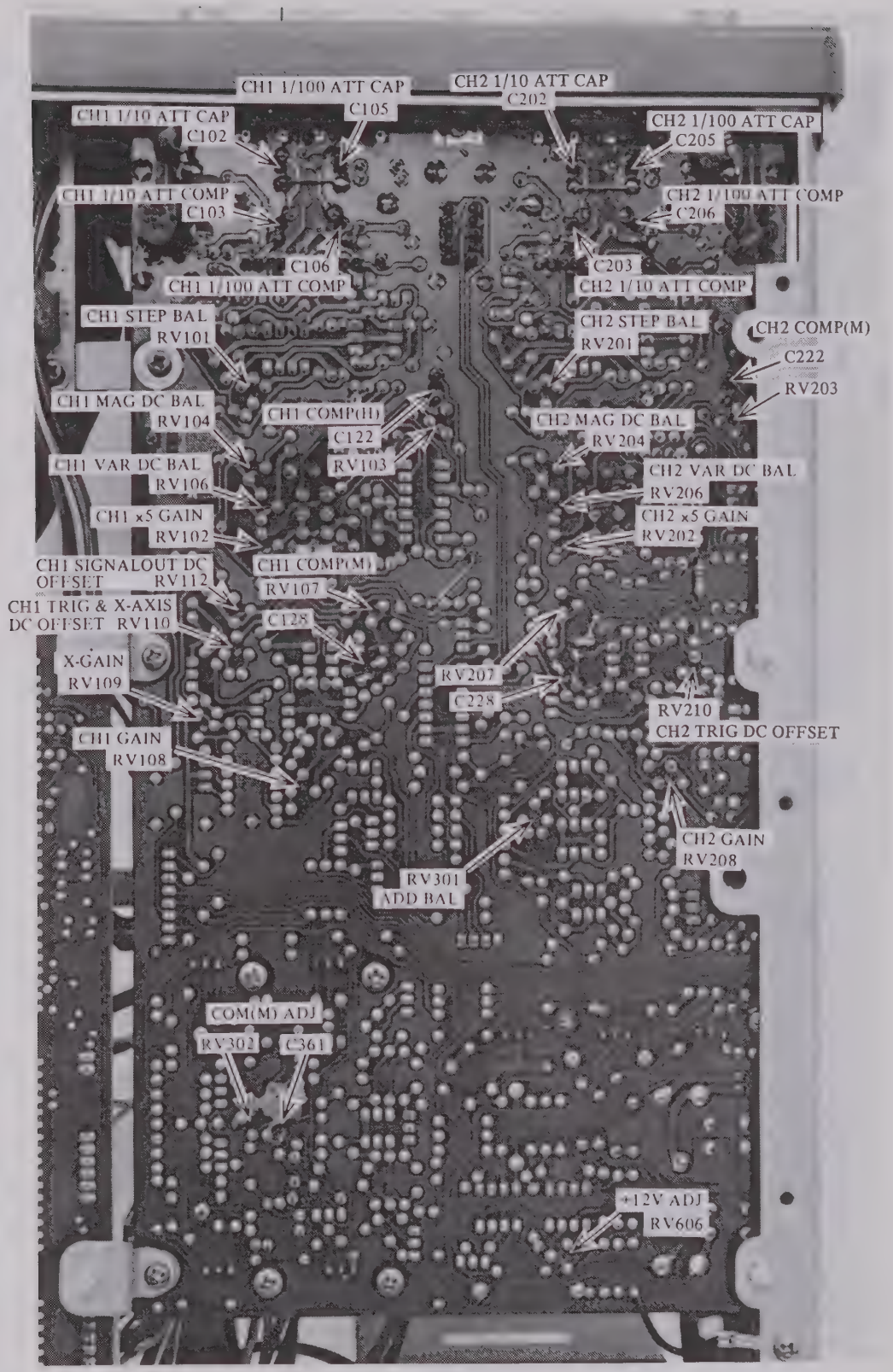


Figure 3-33 Location of Adjustment Parts for Printed Circuit Board A1

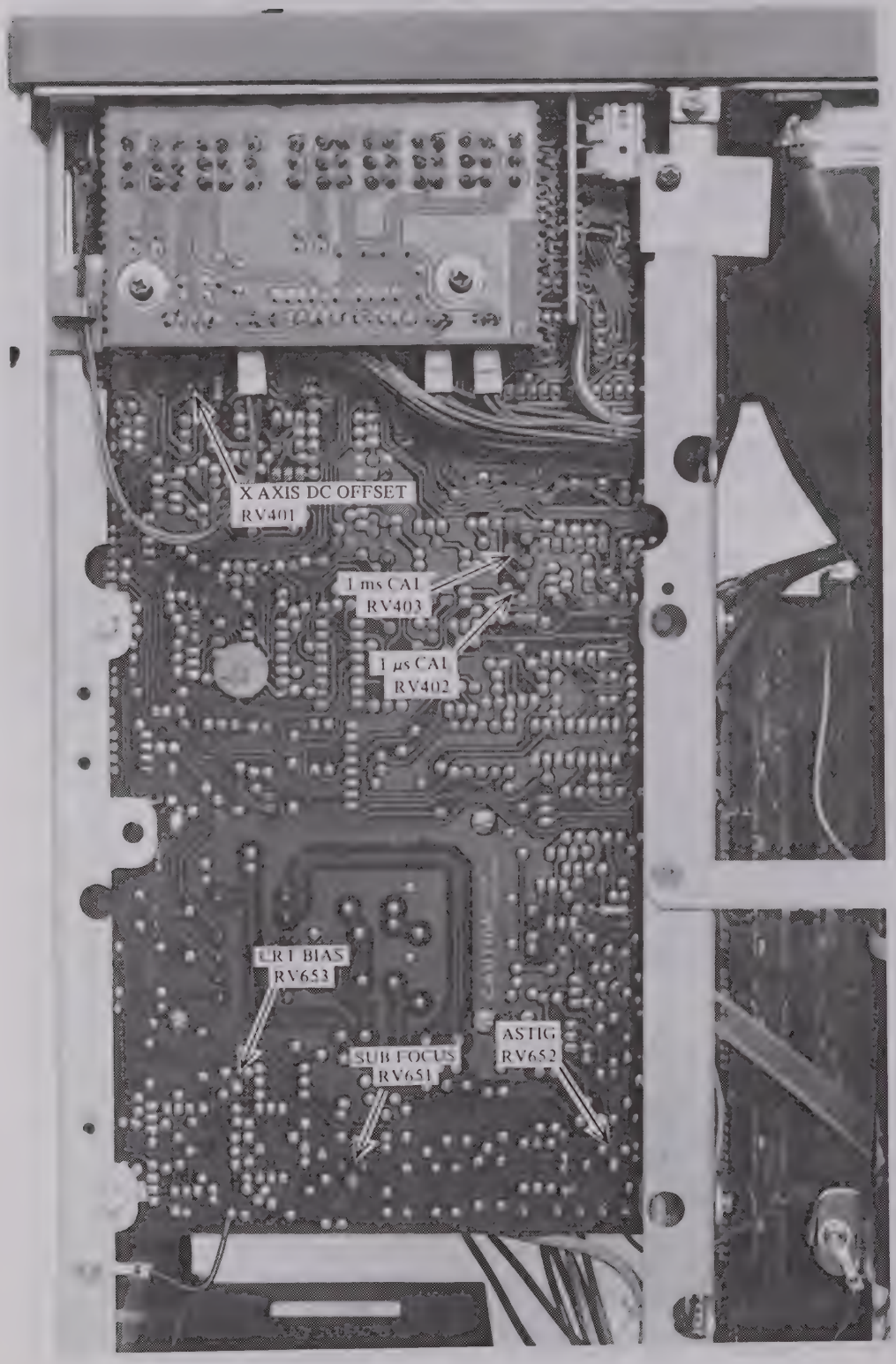


Figure 3-34 Location of Adjustment Parts for Printed Circuit Board A2

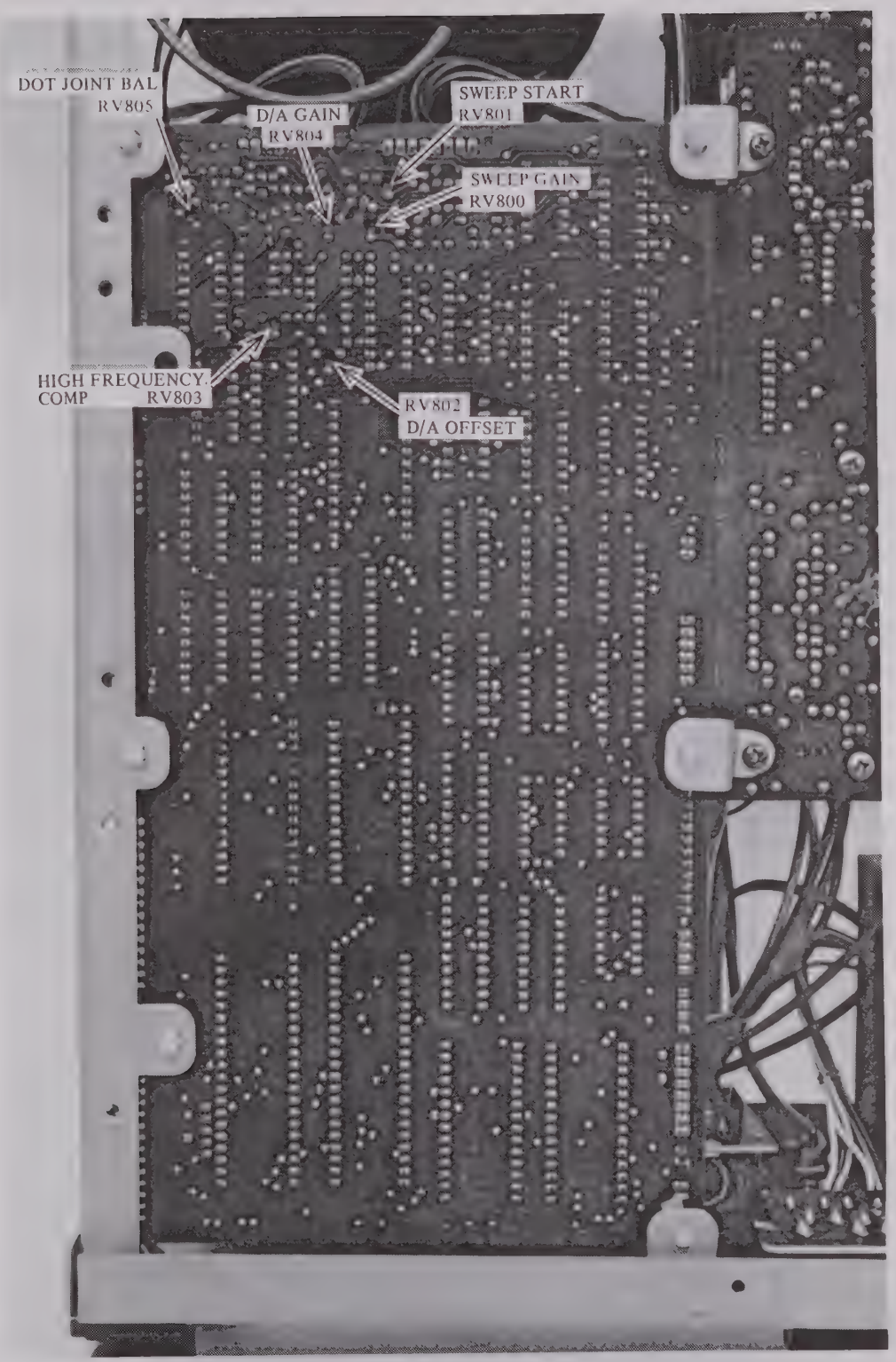


Figure 3-35 Locationof Adjustment Parts for Printed Circuit Board A5

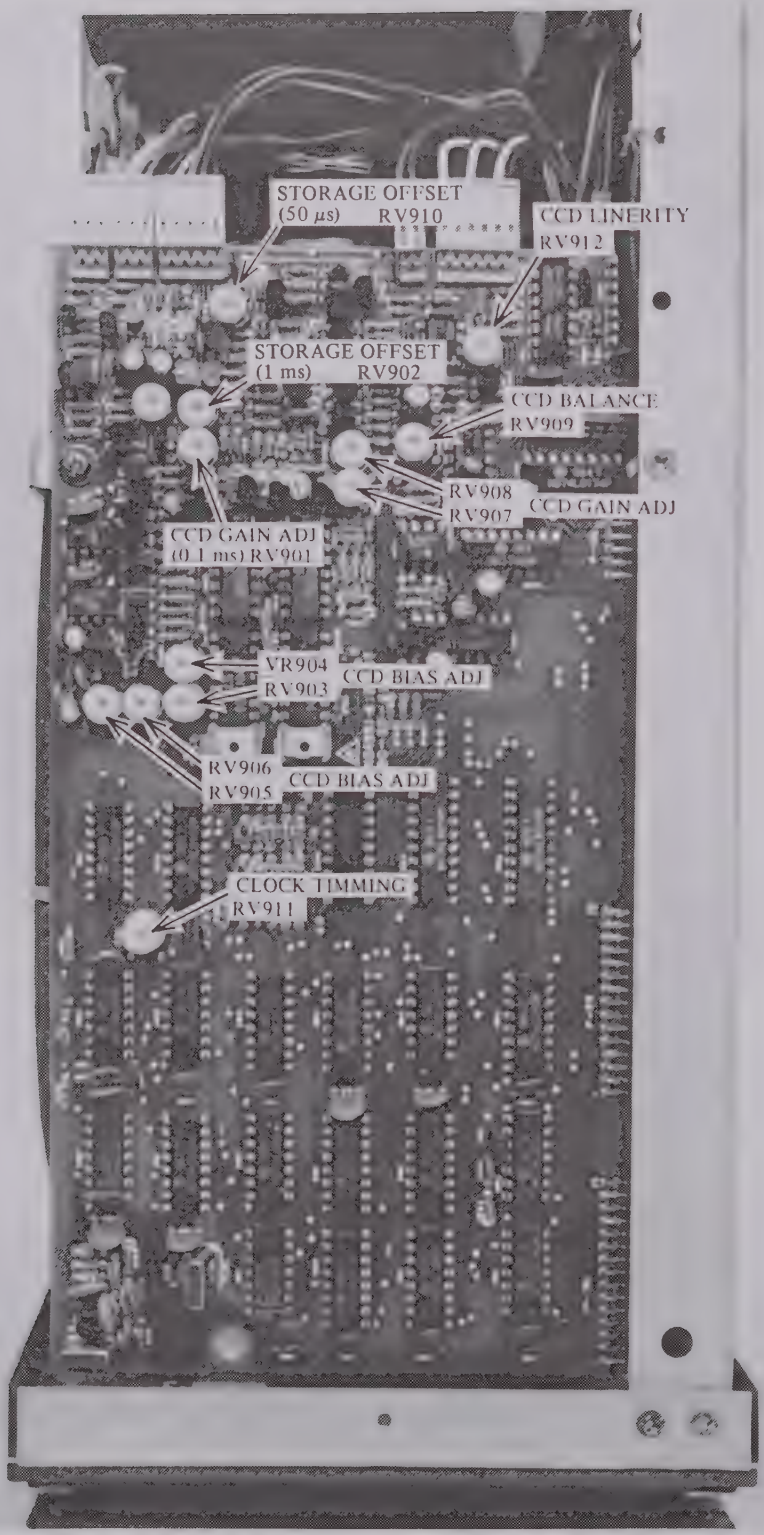


Figure 3-36 Location of Adjustment Parts for Printed Circuit Board A6

3.4 TROUBLESHOOTING

3.4.1 Summary

When there found something wrong in its operation, check all the functional point by operation, first of all.

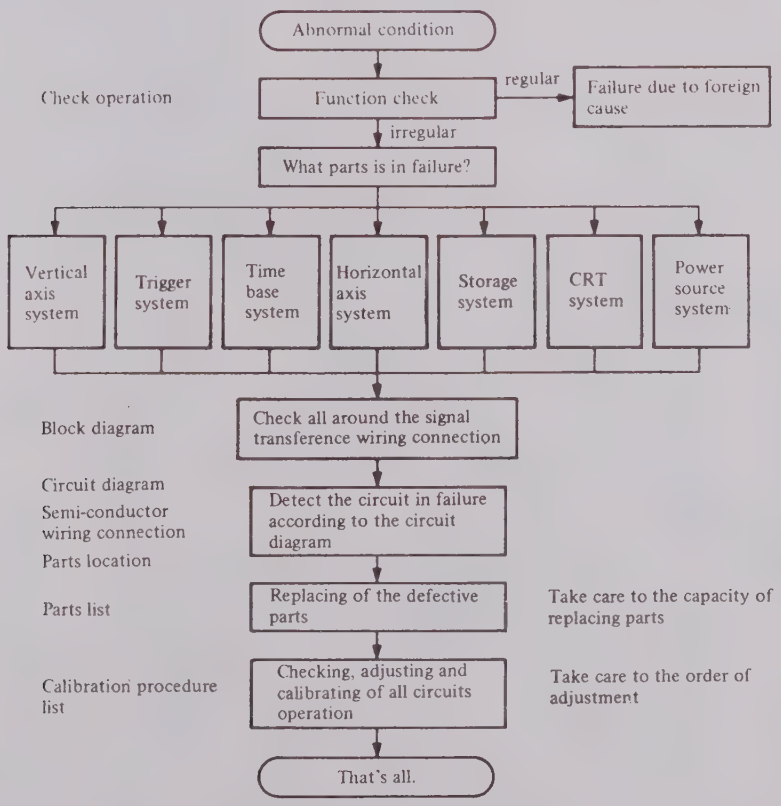
In case confirmed malfunction in the action check if ever, inspect what part of oscilloscope works in failure (as the part belongs either to the vertical or horizontal axis or CRT sequences) and take just the point of the signal transference routine around the defective parts in connection with the network by the block diagram.

And detect the circuit in trouble, by making use of circuit diagram and based upon all those symptoms of power voltages of each parts and displaying waveforms.

All those of parts terminal wiring connection, and parts location on each PCB should be of great aid in case of detecting failure.

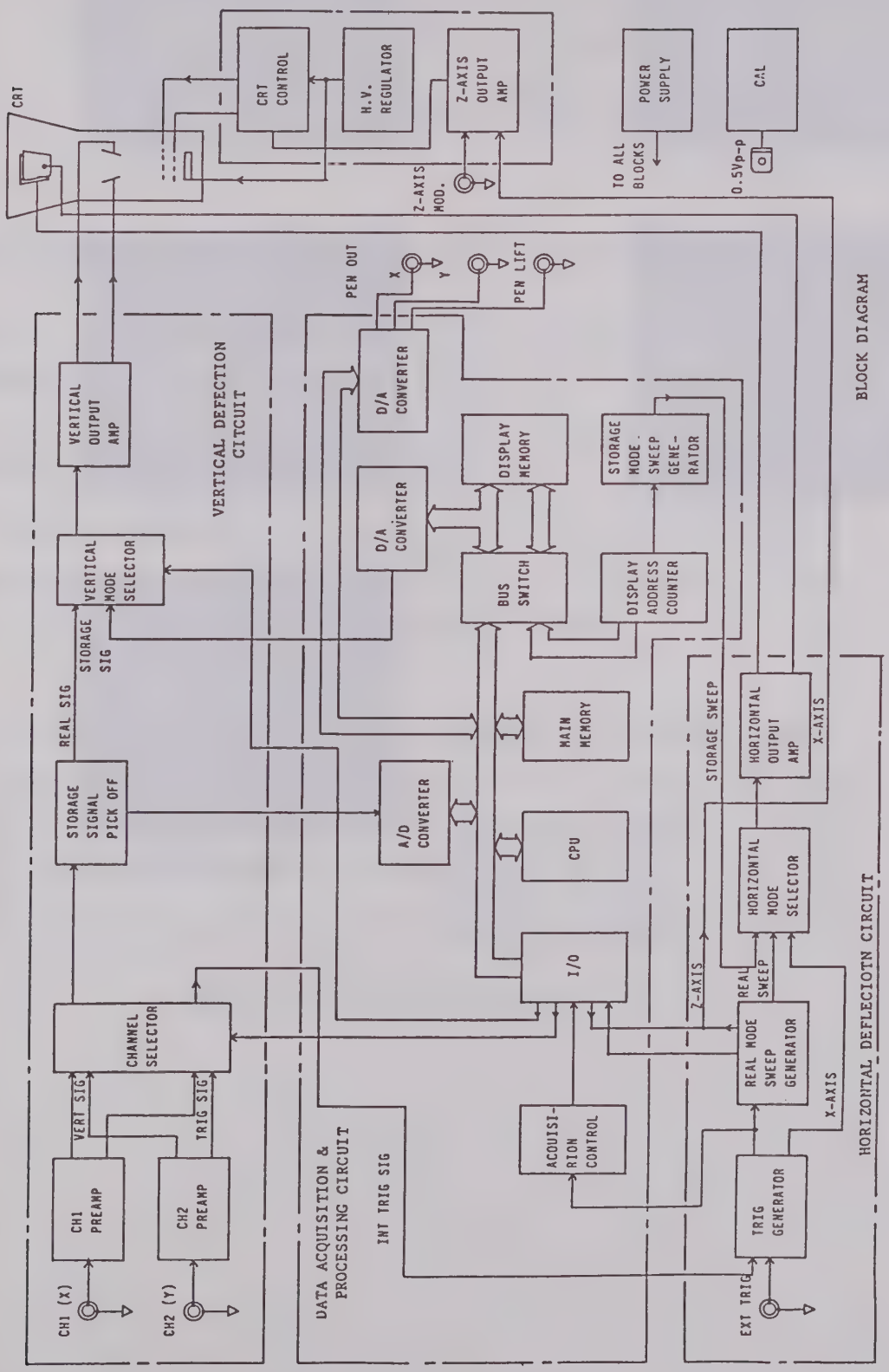
Upon detected an irregular circuit, and found an abnormal parts, inspect the capacity of the parts in question according to the parts list (of electronic). Since the instrument is comprised of some particular specified ones in some circuitries. Apply our specified parts or the equivalent ones based on the full knowledge of the efficiency of the parts used.

And after made some repairs, be sure to take necessary steps for each calibrating items with the adjustment of the defective points and in whole operation in context with the repairment of some parts.



3.4.2 Block Diagram

The following is the block diagram of this unit.



3.4.3 Circuit Diagram

COS 5040 VERT AMP ◇1◇ ---------- 61
COS 5040 TRIGGER & SWEEP ◇2◇ ---------- 63
COS 5040 HV & POWER SUPPLY ◇3◇ ---------- 65
COS 5040 PROCESSING UNIT ◇4◇ ---------- 67
COS 5040 CCD TIME EXPANDER ◇5◇ ---------- 69
COS 5040 A5 POWER DISTRIBUTION ◇6◇ ---------- 71

- Note:
  The parts in the circuit diagram indicated in Table 3-10 are omitted the unit of value and function.

Parts	Omitted Unit	Omitted Function
Resistor	Ω (ohm)	Unless otherwise specified, resistors' values are ±5%, carbon type Allowable power applied to the resistors are 1/4 watt for printed circuit boards A1, A2 and 1/6 watt for other printed circuit boards.
Capacitor	F (farad)	Refer to the parts list for the type, precise value, and resisting voltage for details.

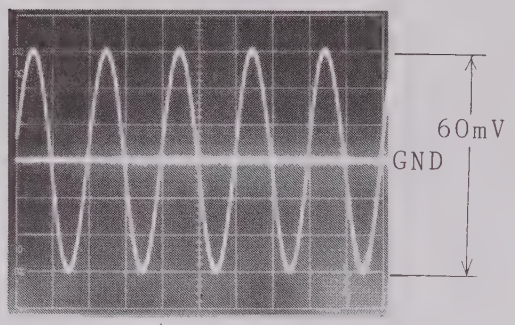
Table 3-10 List of Omitted Unit and Function

And, the special symbols using in the circuit diagram are explained in Table 3-11.

Symbol	Description
△	Indicates metallized resistor.
※	The part may be change its value due to unavoidable production reasons. Indicated value is standard.
⊘	Semi-fixed variable resistor.

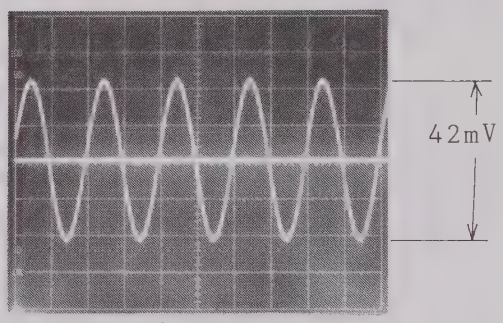
Table 3-11 Special Symbol and its Description

①



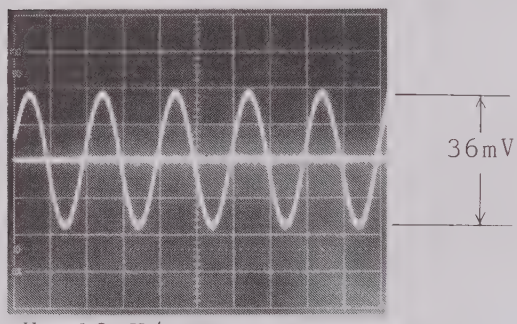
V: 10mV/DIV
H: 0.5ms/DIV

②
③



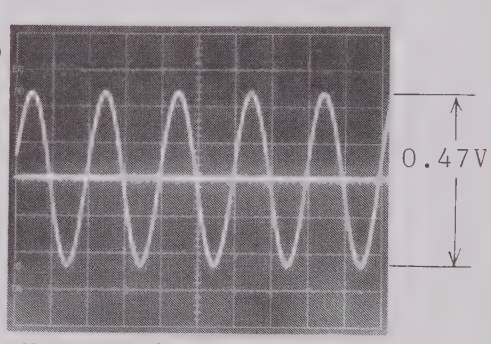
V: 10mV/DIV
H: 0.5ms/DIV

④
⑤



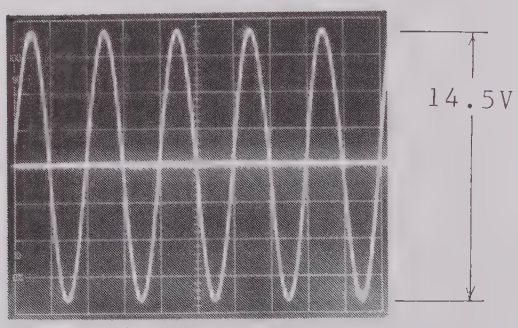
V: 10mV/DIV
H: 0.5ms/DIV

⑥
⑦

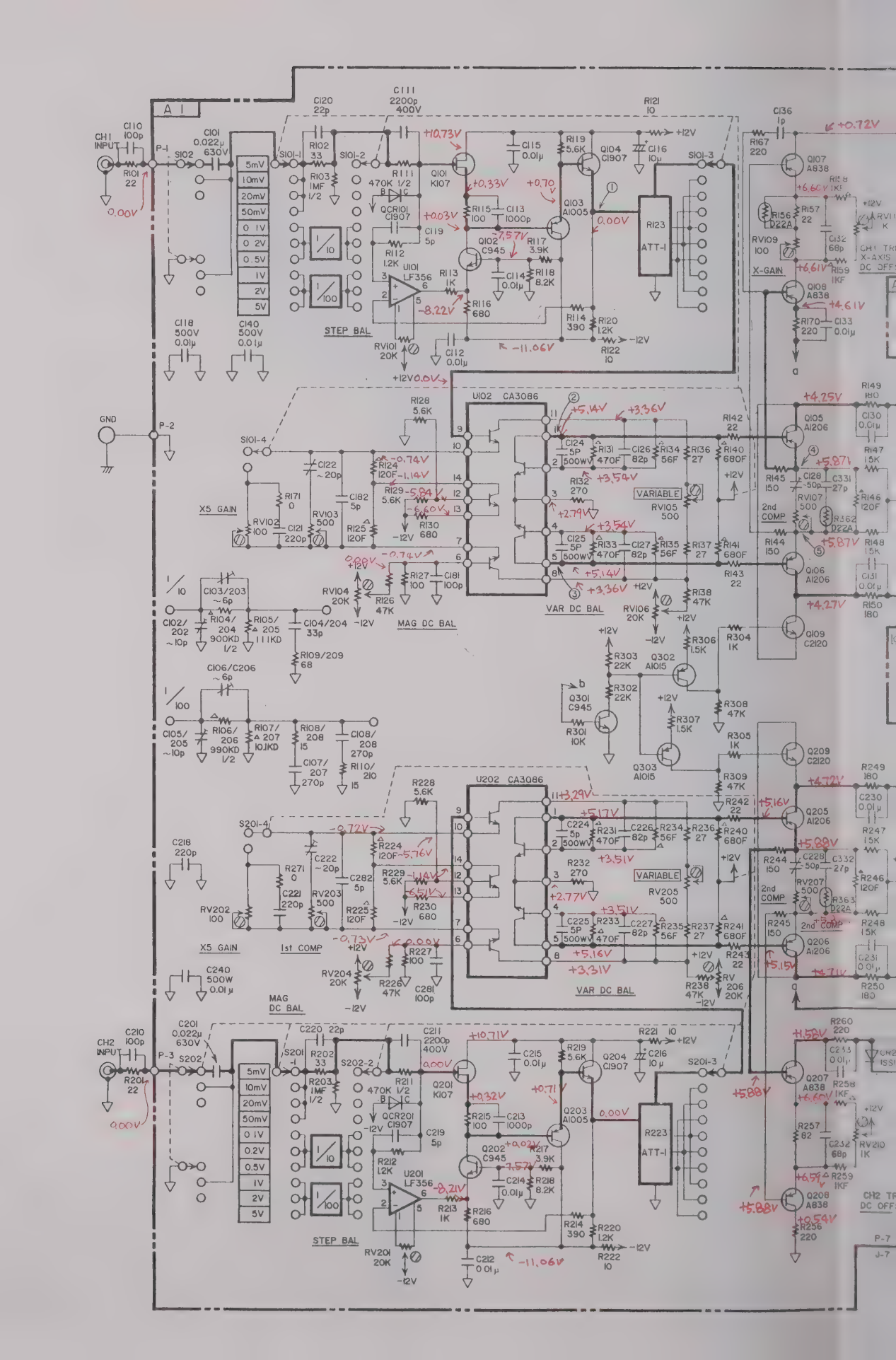


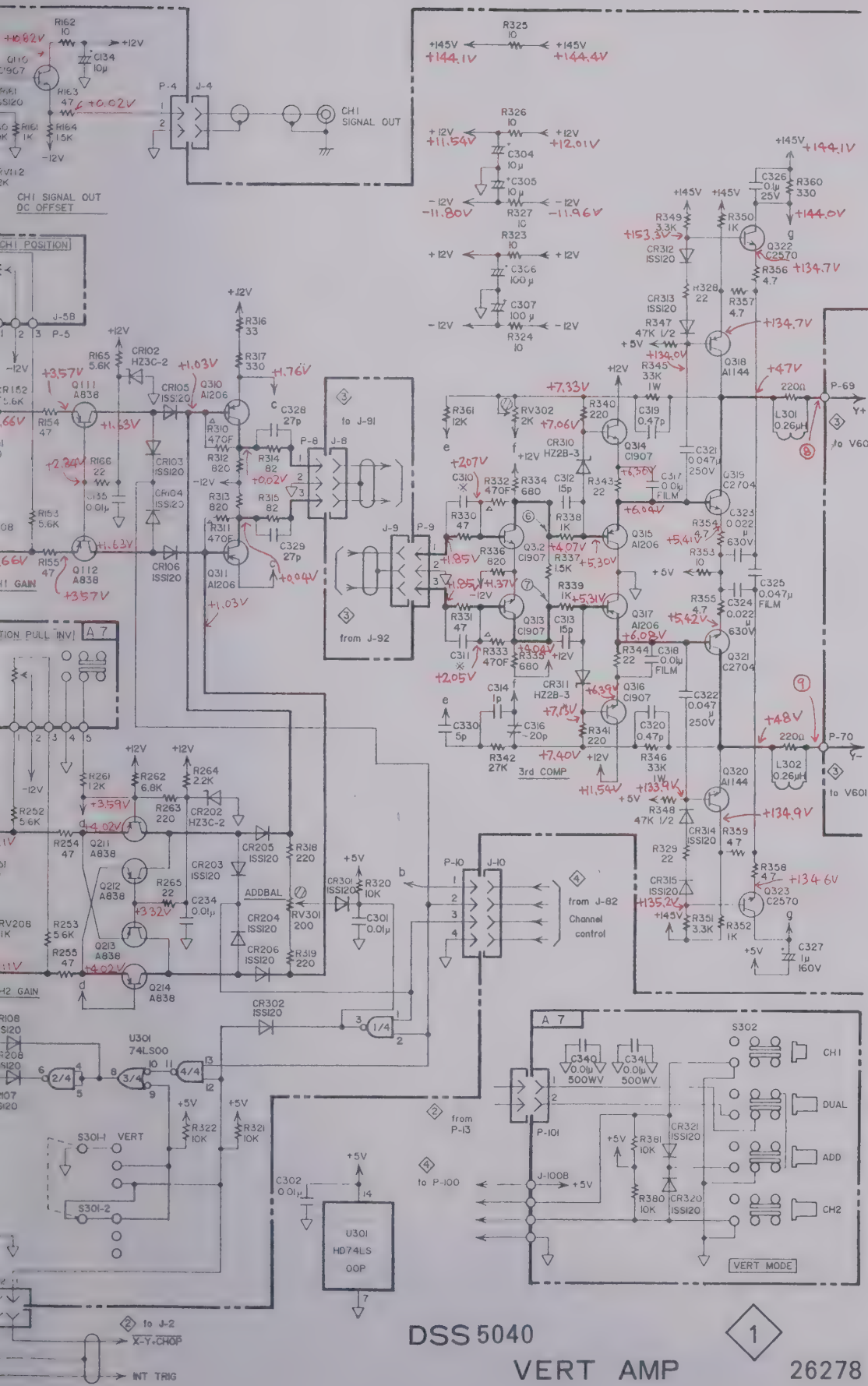
V: 0.1V/DIV
H: 0.5ms/IDV

⑧
⑨

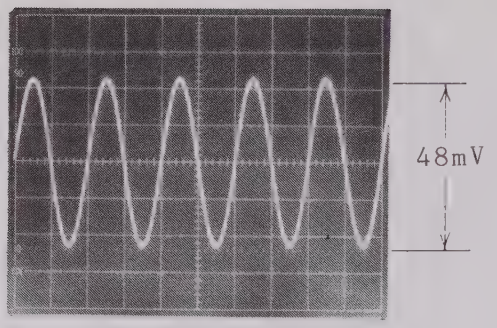


V: 2V/DIV
H: 0.5ms/DIV


A 1
CH1 INPUT
C110 100p
C101 0.022µ 630V
P-1
SI02
SI01-1
SI01-2
SI01-3
5mV
10mV
20mV
50mV
0 1V
0 2V
0.5V
1V
2V
5V
R101 22
0.00V
R102 33
R103 1MF 1/2
R112 1.2K
C120 22p
C111 2200p 400V
R111 470K 1/2
QCR101 C1907
C119 5p
Q101 K107
+10.73V
+0.33V
+0.03V
C115 0.01µ
R115 100
C113 1000p
Q102 C945
-7.57V
R117 3.9K
C114 0.01µ
R118 8.2K
R119 5.6K
Q104 C1907
+0.70V
Q103 A1005
0.00V
R121 10
+12V
C116 10µ
R123 ATT-1
U101 LF356
R113 1K
R116 680
-8.22V
STEP BAL
RV101 20K
C112 0.01µ
-11.06V
R114 390
R120 1.2K
R122 10
-12V
C118 500V 0.01µ
C140 500V 0.01µ
C136 1p
R167 220
Q107 A838
+0.72V
+6.60V
R158 1K
R156 D22A
R157 22
RV109 100
X-GAIN
+6.61V
R159 1KF
C132 68p
RV110 1K
CH1 TRACE X-AXIS DC OFFSET
Q108 A838
+4.61V
R170 220
C133 0.01µ
GND
P-2
U102 CA3086
+5.14V
+3.36V
R128 5.6K
SI01-4
C122 ~20p
R124 120F
-0.74V
-1.14V
C182 5p
R129 5.6K
-5.84V
-6.60V
R130 680
R171 0
RV102 100
C121 220p
RV103 500
R125 120F
-12V
X5 GAIN
0.88V
+12V
-0.74V
R127 100
C181 100p
RV104 20K
R126 47K
MAG DC BAL
1/10
C103/203 ~6p
C102/202 ~10p
R104/204 900KD 1/2
R105/205 111KD
C104/204 33p
R109/209 68
C124 5p 500WV
R131 470F
C126 82p
R134 56F
R136 27
R140 680F
R132 270
+3.54V
+2.79V
VARIABLE
RV105 500
C125 5p 500WV
R133 470F
C127 82p
R135 56F
R137 27
R141 680F
R138 47K
VAR DC BAL
RV106 20K
R142 22
R143 22
R149 180
C130 0.01µ
+4.25V
Q105 A1206
R145 150
C128 ~50p
C331 27p
R147 1.5K
+5.87V
RV107 500
2nd COMP
R362 D22A
R146 120F
R144 150
+5.87V
R148 1.5K
Q106 A1206
C131 0.01µ
R150 180
+4.27V
Q109 C2120
R303 22K
Q302 A1015
R306 1.5K
R304 1K
R302 22K
Q301 C945
R301 10K
R307 1.5K
R308 47K
Q303 A1015
R305 1K
Q209 C2120
R309 47K
R249 180
+4.72V
C230 0.01µ
+5.16V
Q205 A1206
+5.88V
R247 1.5K
C228 ~50p
C332 27p
R244 150
R246 120F
RV207 500
2nd COMP
R363 D22A
R245 150
2nd COMP
R248 1.5K
Q206 A1206
C231 0.01µ
+5.15V
+4.71V
R250 180
C106/C206 ~6p
1/100
C105/205 ~10p
R106/206 990KD 1/2
R107/207 10.1KD
R108/208 15
C107/207 270p
C108/208 270p
R110/210 15
U202 CA3086
+3.29V
+5.17V
R228 5.6K
S201-4
C218 220p
-0.72V
R224 120F
-5.76V
C222 ~20p
C282 5p
R229 5.6K
-1.14V
-5.51V
R230 680
R271 0
C221 220p
RV203 500
RV202 100
R225 120F
-12V
X5 GAIN
1st COMP
-0.73V
+12V
0.00V
R227 100
C281 100p
RV204 20K
R226 47K
C240 500W 0.01µ
MAG DC BAL
C224 5p 500WV
R231 470F
C226 82p
R234 56F
R236 27
R240 680F
R232 270
+3.51V
+2.77V
VARIABLE
RV205 500
C225 5p 500WV
R233 470F
C227 82p
R235 56F
R237 27
R241 680F
R238 47K
RV 206 20K
R242 22
R243 22
VAR DC BAL
CH2 INPUT
C210 100p
C201 0.022µ 630V
P-3
S202
S201-1
S202-2
S201-3
R201 22
0.00V
R202 33
R203 1MF 1/2
C220 22p
C211 2200p 400V
R211 470K 1/2
QCR201 C1907
C219 5p
Q201 K107
+10.71V
+0.32V
0.00V
+0.71V
C215 0.01µ
R215 100
C213 1000p
Q202 C945
+0.02V
-7.57V
R217 3.9K
C214 0.01µ
R218 8.2K
R219 5.6K
Q204 C1907
Q203 A1005
0.00V
R221 10
+12V
C216 10µ
R223 ATT-1
U201 LF356
R213 1K
R216 680
-8.21V
STEP BAL
RV201 20K
C212 0.01µ
-11.06V
R214 390
R220 1.2K
R222 10
-12V
R260 220
+1.52V
C233 0.01µ
+5.88V
+6.60V
R258 1KF
R257 82
C232 68p
RV210 1K
+6.59V
R259 1KF
+5.88V
Q208 A838
+0.54V
R256 220
CH2 TRACE DC OFFSET
P-7
J-7

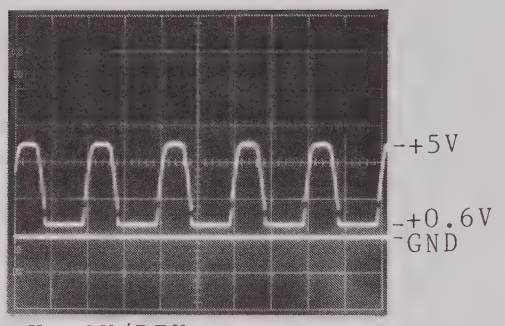

CH1 SIGNAL OUT
DC OFFSET
CH1 POSITION
CH1 SIGNAL OUT
to J-91
from J-92
3rd COMP
from J-82
Channel control
ADDBAL
from P-13
to P-100
to J-2
X-Y+CHOP
INT TRIG
S301-H VERT
S301-2
S302
CH1
DUAL
ADD
CH2
VERT MODE
to V601
to V601
DSS 5040
VERT AMP
1
26278

⑩



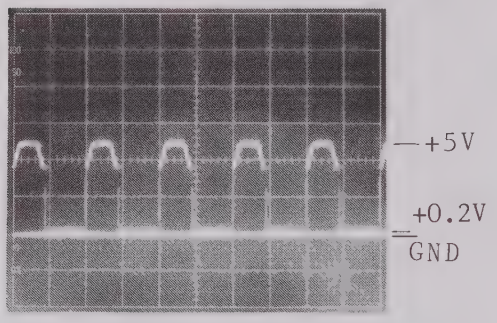
V: 10mV/DIV
H: 0.5ms/DIV

⑪



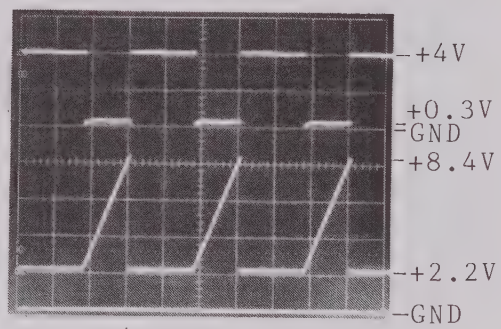
V: 2V/DIV
H: 0.5ms/DIV

⑫



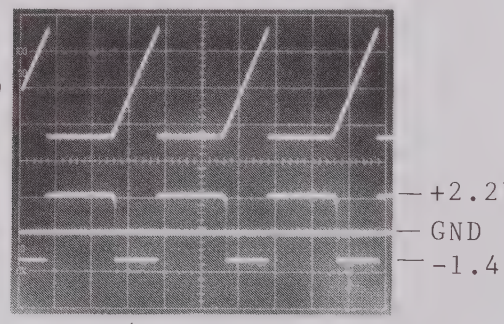
V: 2V/DIV
H: 0.5ms/DIV

⑬
⑭



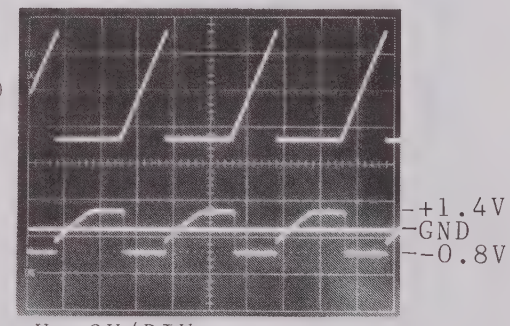
V: 2V/DIV
H: 1ms/DIV

⑭
⑮



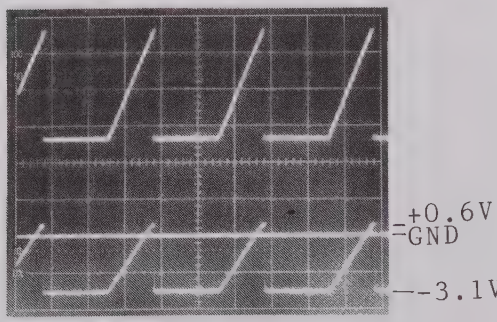
V: 2V/DIV
H: 1ms/DIV

⑭
⑯



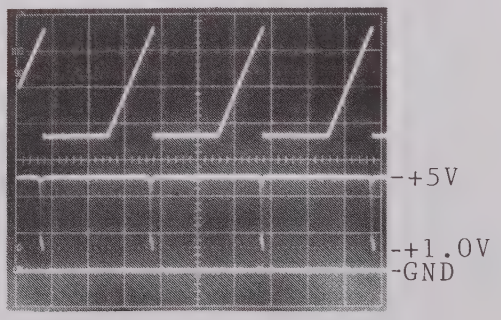
V: 2V/DIV
H: 1ms/DIV

⑭
⑰

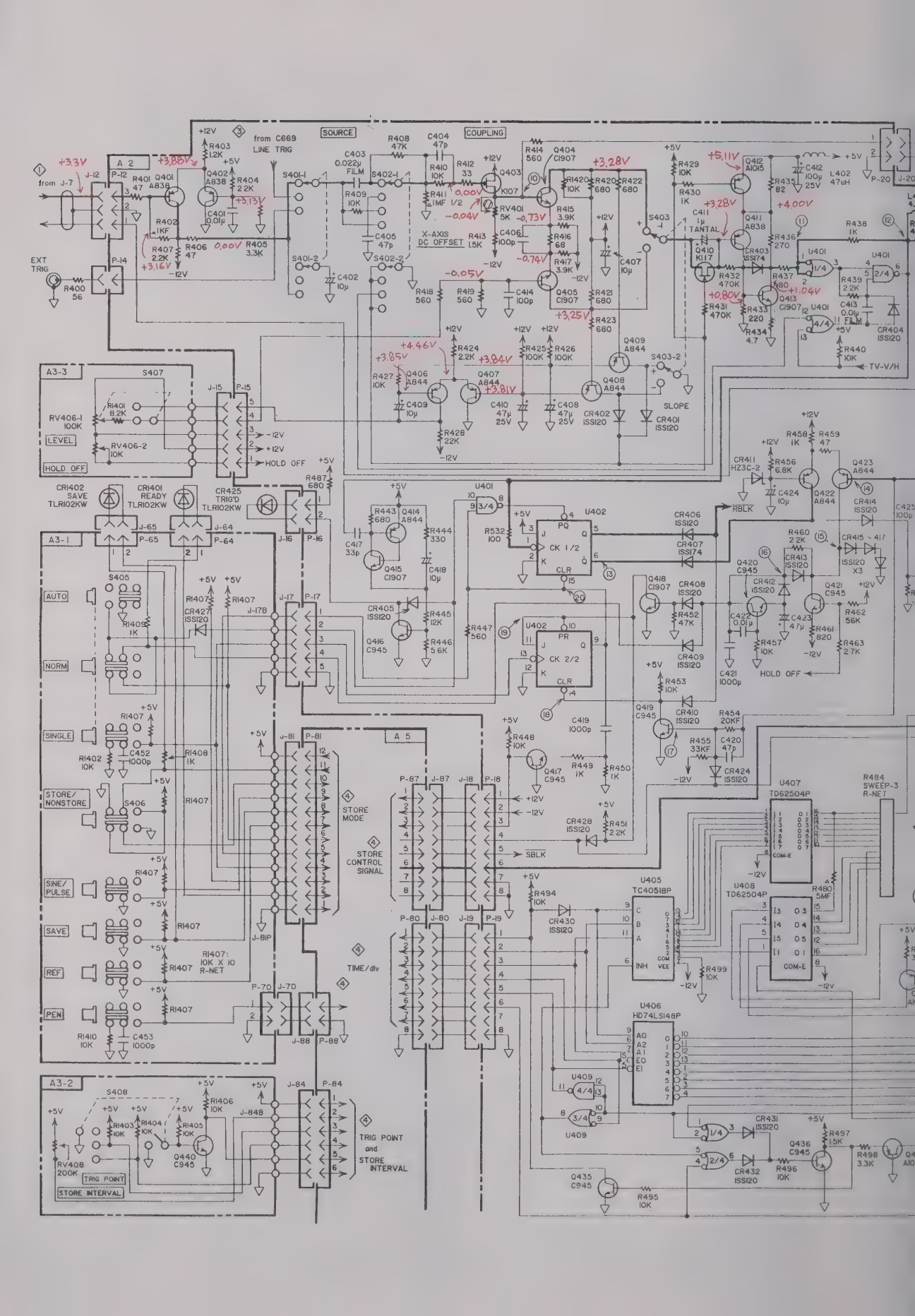


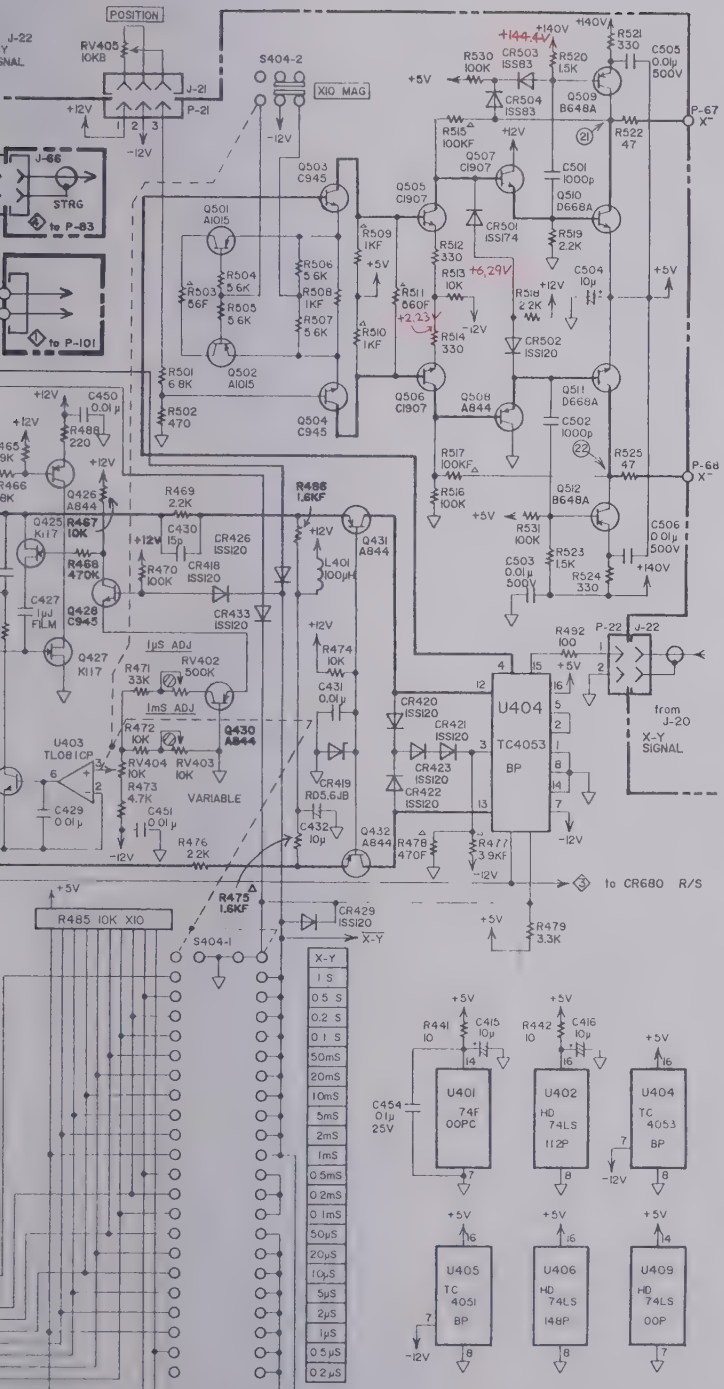
V: 2V/DIV
H: 1ms/DIV

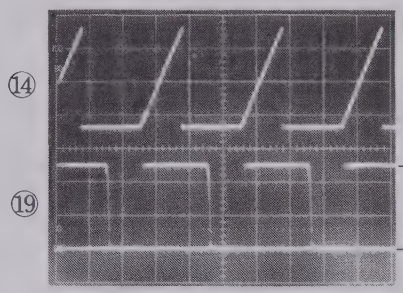
⑭
⑱



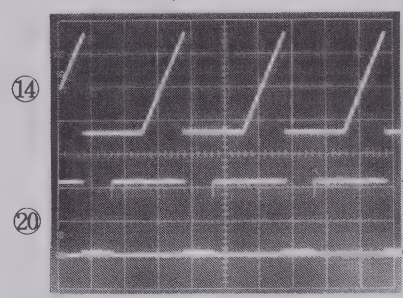
V: 2V/DIV
H: 1ms/DIV


A 2
SOURCE
COUPLING
from C669 LINE TRIG
EXT TRIG
X-AXIS DC OFFSET
SLOPE
TV-V/H
HOLD OFF
A3-3
S407
LEVEL
A3-1
AUTO
NORM
SINGLE
STORE/ NONSTORE
SINE/ PULSE
SAVE
REF
PEN
A3-2
TRIG POINT
STORE INTERVAL
STORE MODE
STORE CONTROL SIGNAL
TIME/div
TRIG POINT and STORE INTERVAL
A 5
SBLK
RBLK
HOLD OFF
SWEEP-3 R-NET
R407: 10K X 10 R-NET
U405 TC4051BP
U406 HD74LS148P
U407 TD62504P
U408 TD62504P

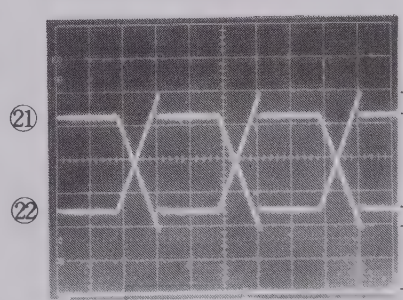




V: 2V/DIV
H: 1ms/DIV



V: 2V/DIV
H: 1ms/DIV

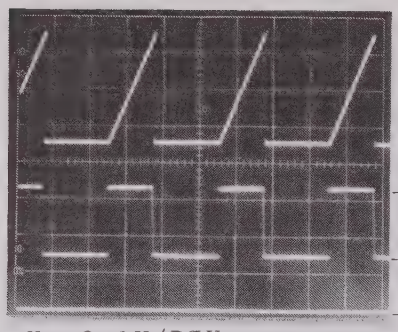


V: 20V/DIV
H: 1ms/DIV

DSS 5040
TRIGGER & SWEEP

2

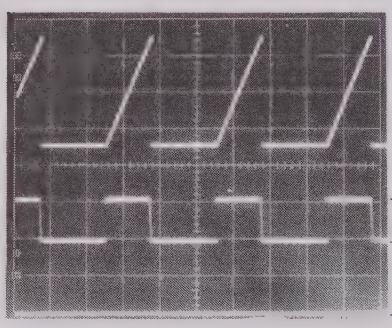
⑭



⑬

V: 0.1V/DIV
H: 1ms/DIV

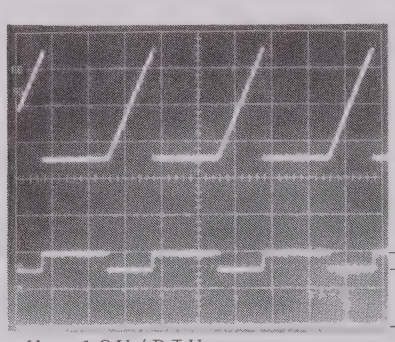
⑭



⑭

V: 20V/DIV
H: 1ms/DIV

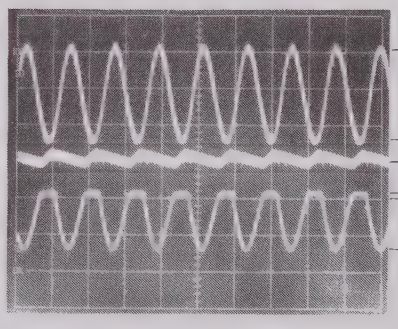
⑭



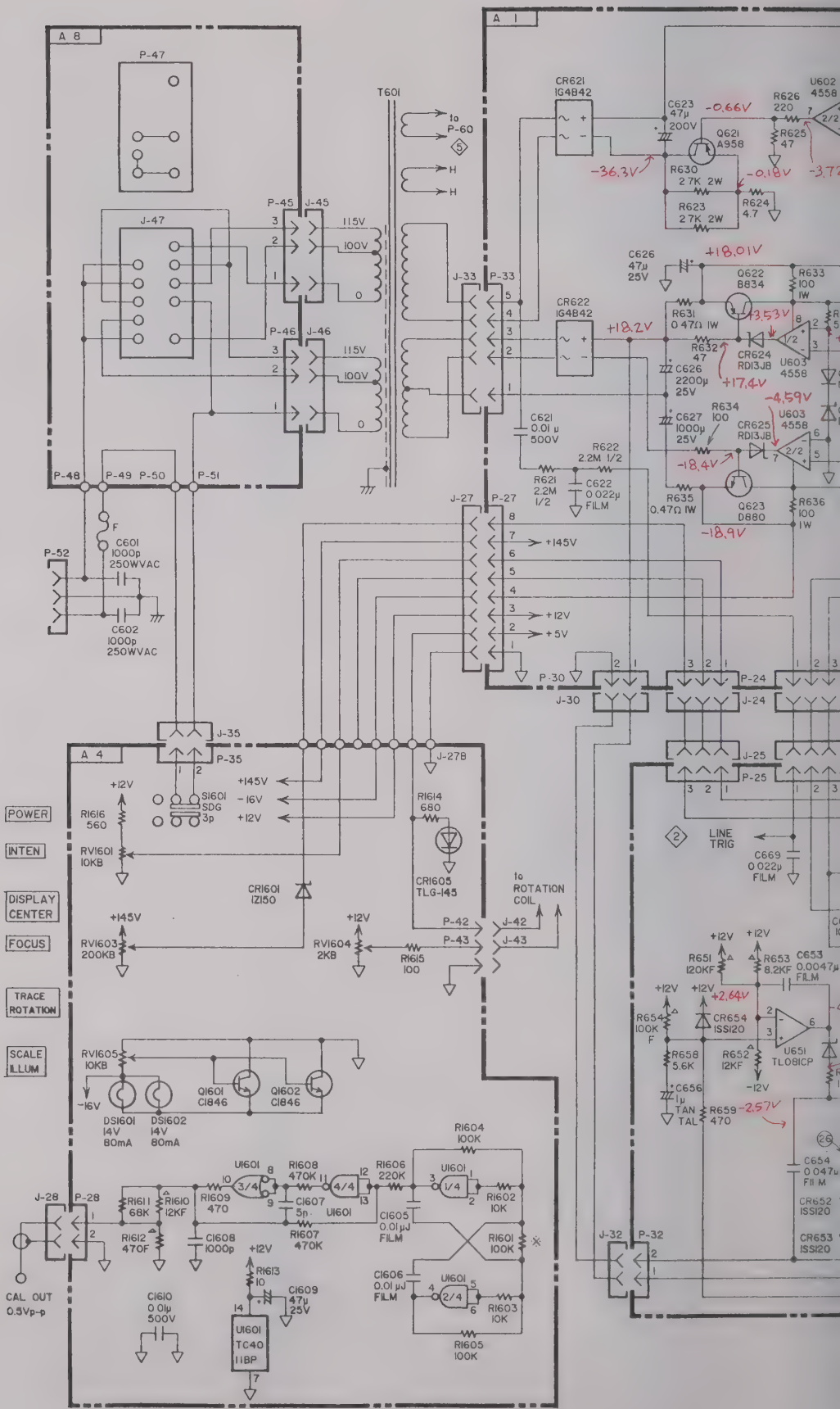
⑮

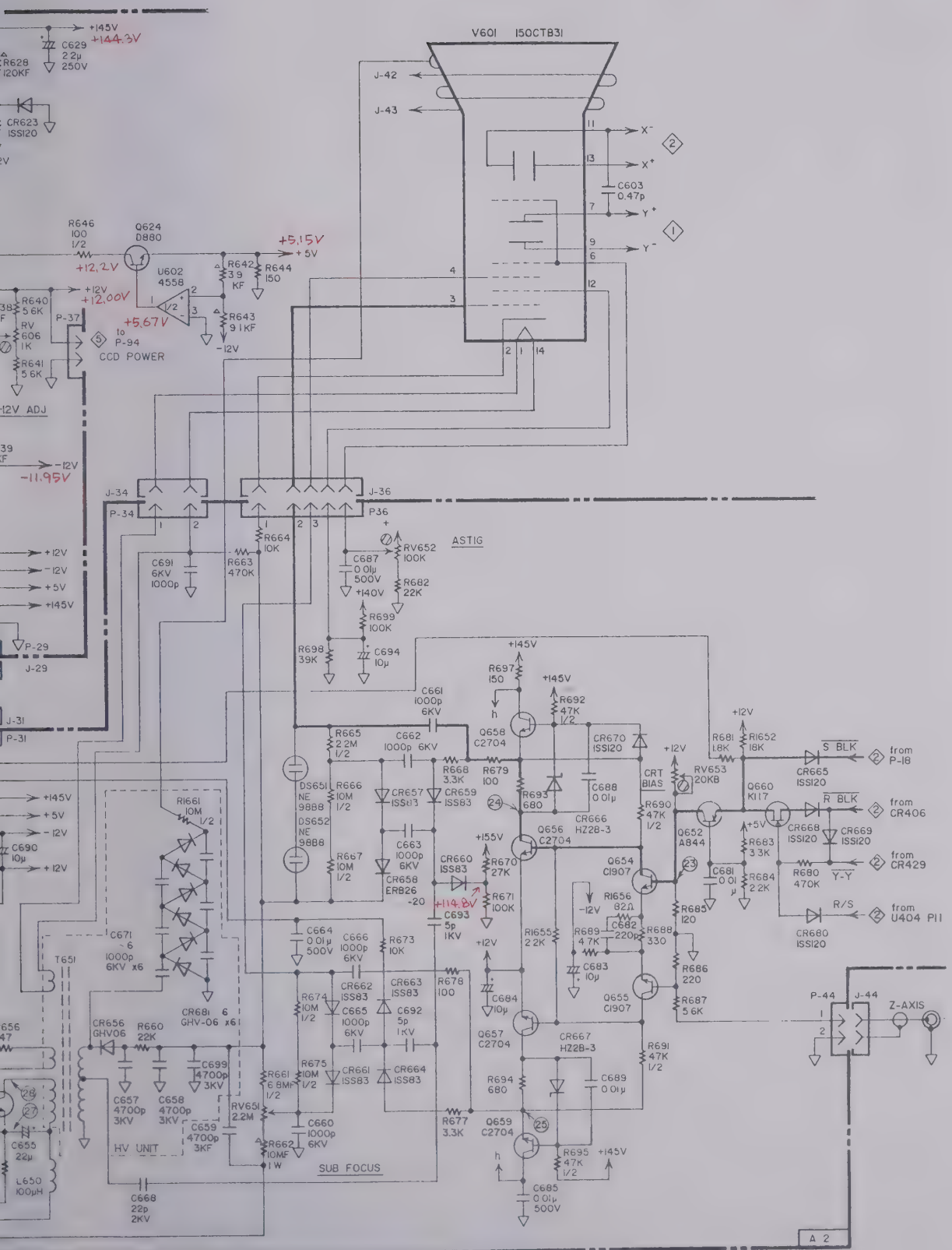
V: 10V/DIV
H: 1ms/DIV

⑯



⑯ V:10V/DIV, H:20μs/DIV
⑰ V:0.1V/DIV, H:20μs/DIV
⑱ V:5V/DIV, H:20μs/DIV

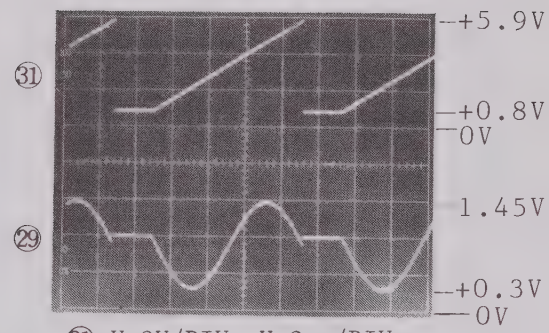

A 8
A 1
A 4
P-47
T601
to P-60
J-47
P-45 J-45
P-46 J-46
115V
100V
J-33 P-33
CR621 1G4B42
CR622 1G4B42
C623 47µ 200V
Q621 A958
R630 2.7K 2W
R623 2.7K 2W
R624 4.7
R626 220
R625 47
U602 4558
-0.66V
-36.3V
-0.18V
C626 47µ 25V
+18.01V
Q622 B834
R631 0.47Ω 1W
R632 47
C626 2200µ 25V
C627 1000µ 25V
R634 100
CR624 RDI3JB
CR625 RDI3JB
U603 4558
R633 100 1W
+18.2V
13.53V
+17.4V
-4.59V
-18.4V
C621 0.01 µ 500V
R622 2.2M 1/2
R621 2.2M 1/2
C622 0.022µ FILM
R635 0.47Ω 1W
Q623 D880
R636 100 1W
-18.9V
P-48 P-49 P-50 P-51
P-52
F
C601 1000p 250WVAC
C602 1000p 250WVAC
J-27 P-27
+145V
+12V
+5V
P-30 J-30
P-24 J-24
P-25 J-25
J-35 P-35
J-278
SI601 SDG 3p
R1616 560
RV1601 10KB
R1614 680
CR1605 TLG-145
CR1601 1Z150
RV1603 200KB
RV1604 2KB
R1615 100
P-42 P-43
J-42 J-43
to ROTATION COIL
LINE TRIG
C669 0.022µ FILM
POWER
INTEN
DISPLAY CENTER
FOCUS
TRACE ROTATION
SCALE ILLUM
RV1605 10KB
Q1601 C1846
Q1602 C1846
DS1601 14V 80mA
DS1602 14V 80mA
R651 120KF
R653 8.2KF
C653 0.0047µ FILM
+2.64V
R654 100K F
CR654 1S1120
R658 5.6K
R652 12KF
U651 TL081CP
C656 1µ TAN TAL
R659 470
-2.57V
U1601
R1604 100K
R1608 470K
R1606 220K
R1609 470
C1607 5p
R1607 470K
C1605 0.01µJ FILM
R1602 10K
R1601 100K
R1603 10K
C1606 0.01µJ FILM
R1611 68K
R1610 12KF
R1612 470F
C1608 1000p
R1613 10
C1609 47µ 25V
C1610 0.01µ 500V
U1601 TC40 11BP
J-28 P-28
CAL OUT 0.5Vp-p
J-32 P-32
C654 0.047µ FILM
CR652 1S1120
CR653 1S1120



DSS 5040 H V & POWER SUPPLY

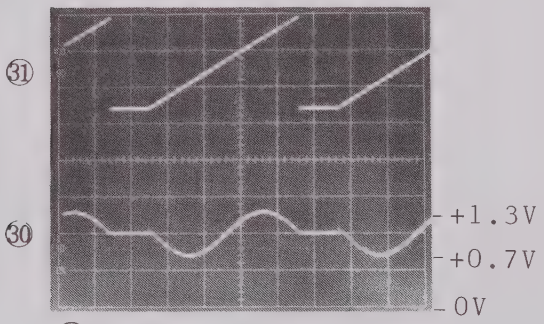
3

26280



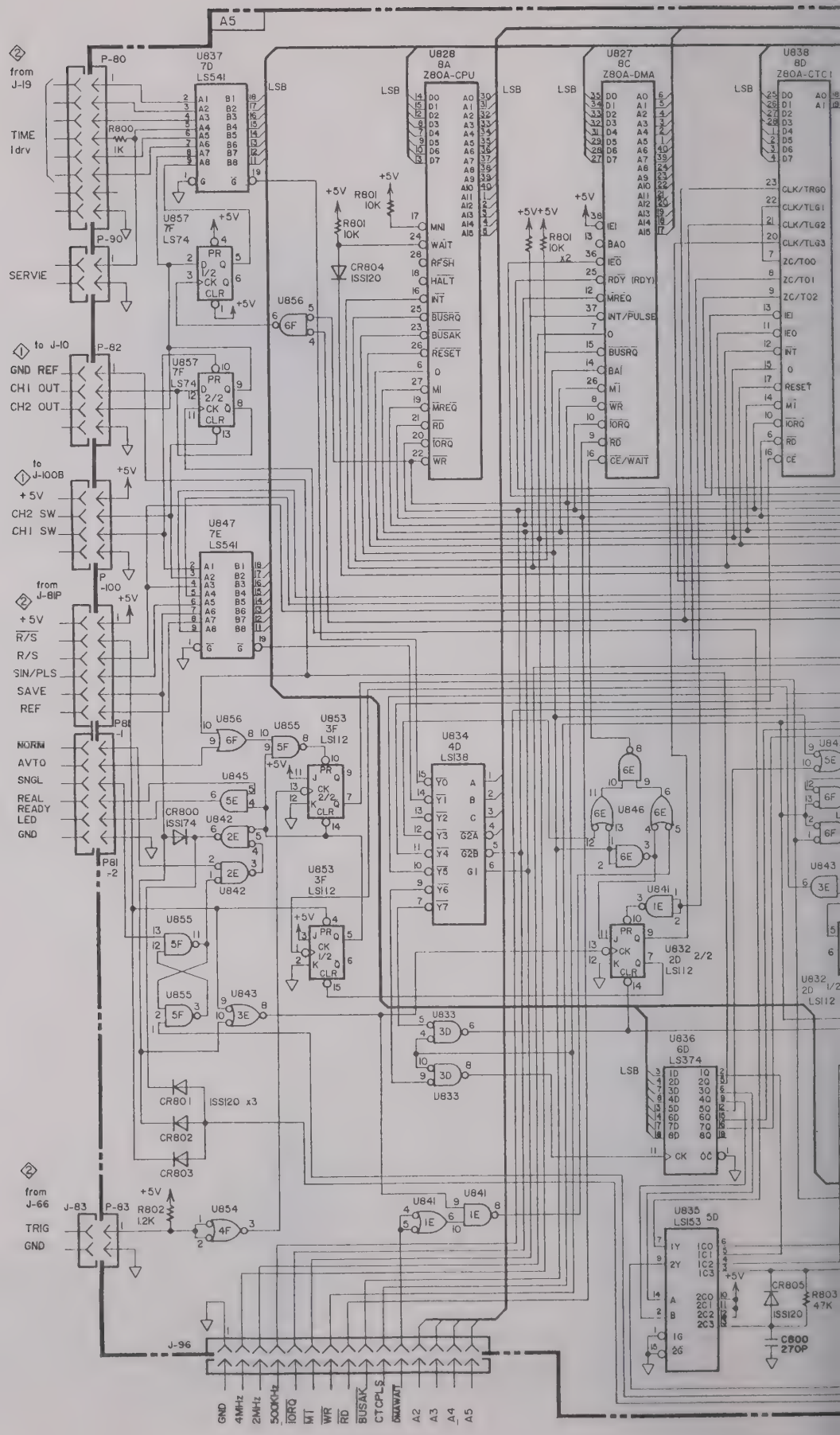
31 V:2V/DIV, H:2ms/DIV

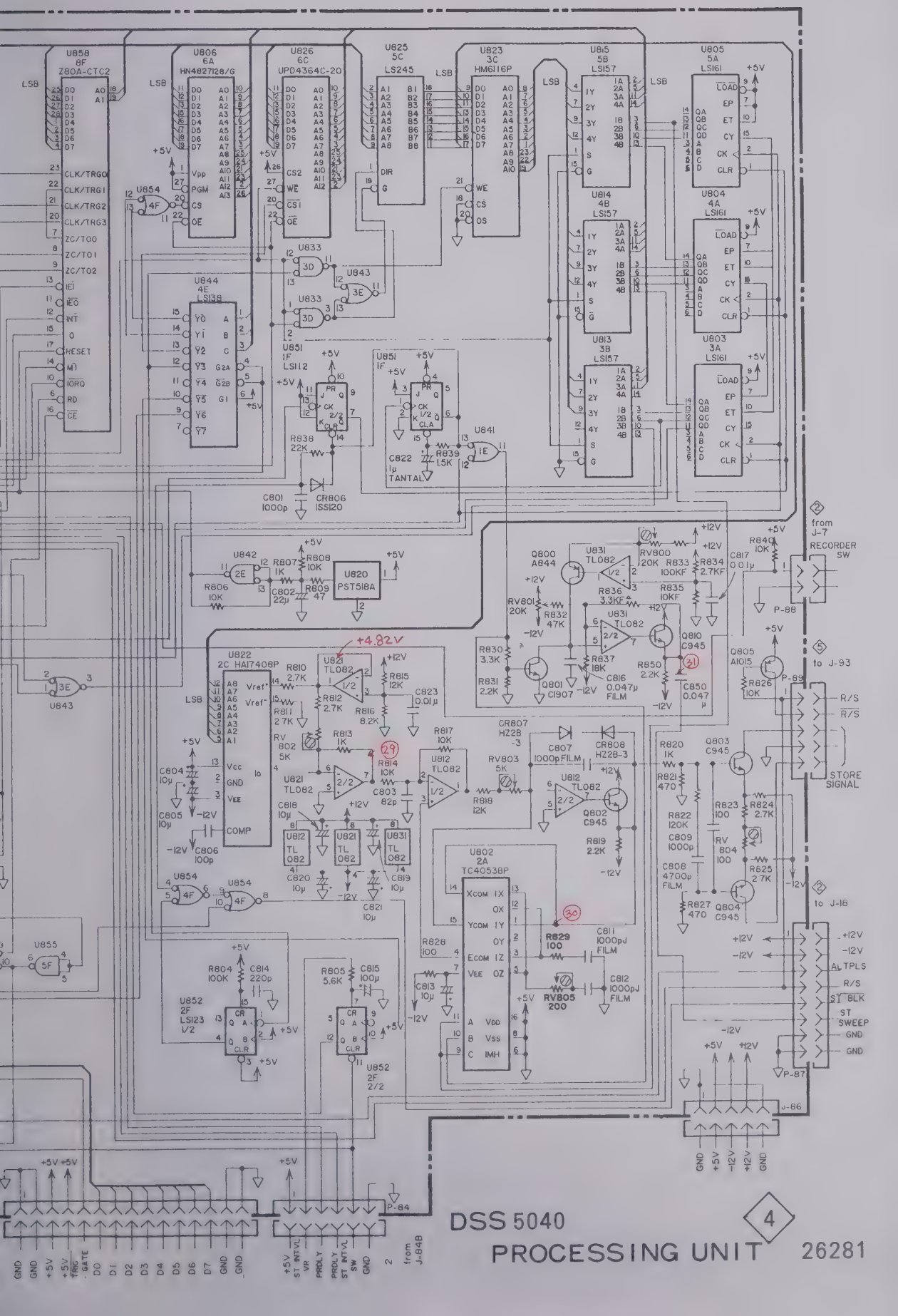
29 V:0.5V/DIV, H:2ms/DIV



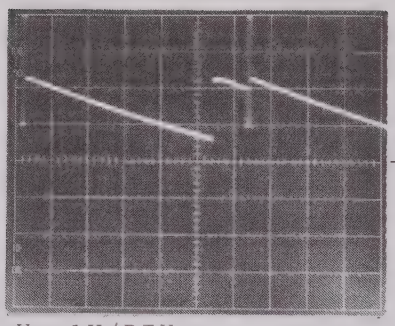
31 V:2V/DIV, H:2ms/DIV

30 V:0.5V/DIV, H:2ms/DIV


A5
from J-19
TIME Idrv
R800 1K
P-80
P-90
SERVIE
to J-10
GND REF
CH1 OUT
CH2 OUT
P-82
to J-100B
+5V
CH2 SW
CH1 SW
P -100
from J-81P
+5V
R/S
R/S
SIN/PLS
SAVE
REF
P81 -1
NORM
AVTO
SNGL
REAL READY LED
GND
P81 -2
U837 7D LS541
U857 7F LS74
U856 6F
U847 7E LS541
U855 5F
U845 5E
U842 2E
CR800 ISSI74
U853 3F LSI12
U834 4D LSI38
U828 8A Z80A-CPU
U827 8C Z80A-DMA
U838 8D Z80A-CTC
R801 10K
CR804 ISSI20
U846 6E
U841 1E
U832 2D LSI12
U836 6D LS374
U833 3D
U843 3E
CR801 ISSI20 x3
CR802
CR803
from J-66
J-83
P-83
TRIG
GND
R802 1.2K
U854 4F
U835 LSI53 5D
CR805 ISSI20
R803 47K
C800 270P
J-96
GND
4MHz
2MHz
500KHz
IORQ
MI
WR
RD
BUSAK
CTCPLS
SWAIT
A2
A3
A4
A5

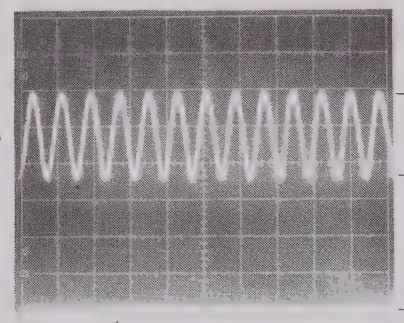

DSS 5040
PROCESSING UNIT
4
26281

㉜



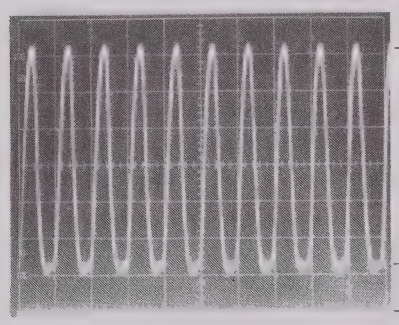
V: 1V/DIV
H: 20ms/DIV

㉝

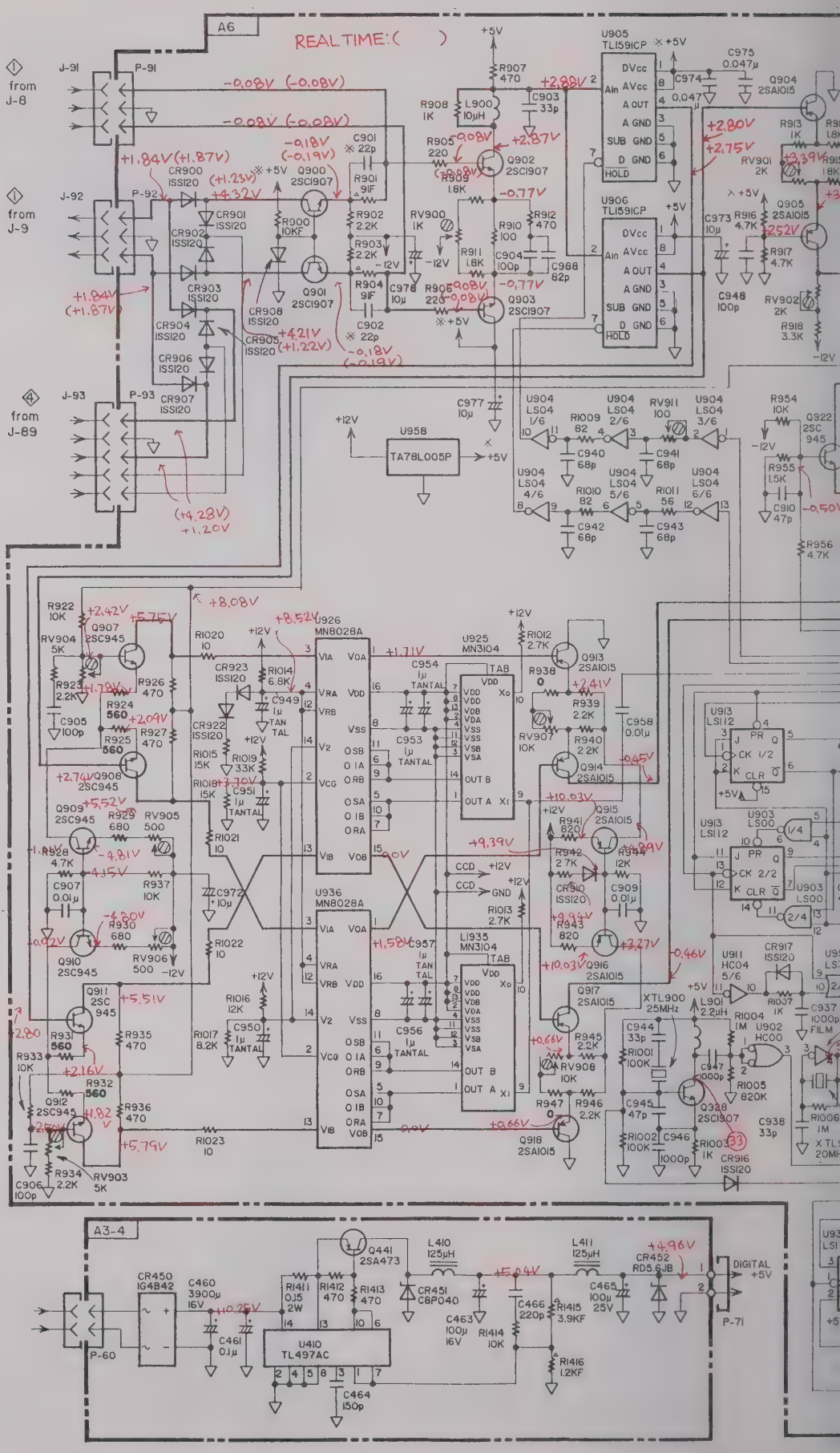


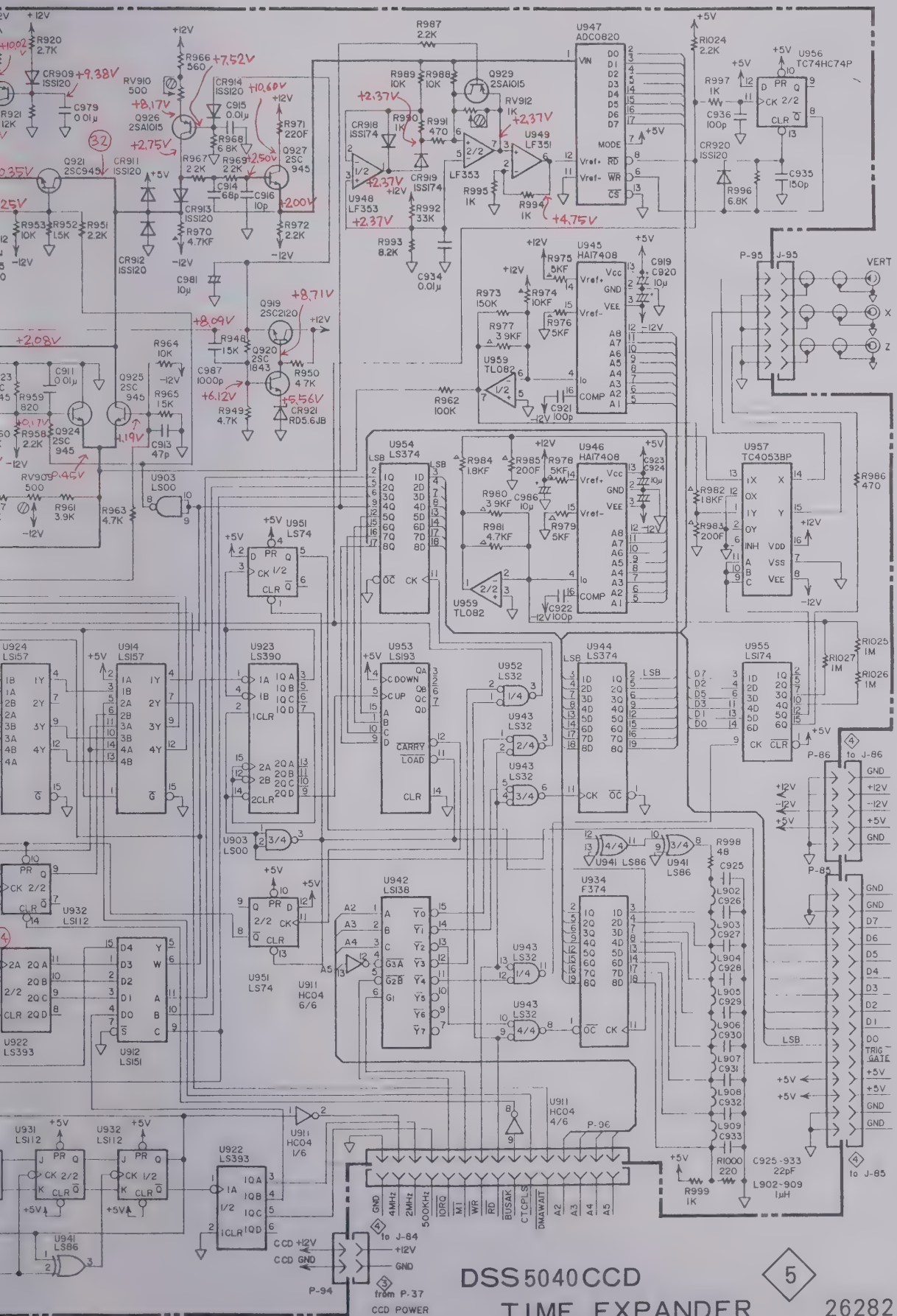
V: 1V/DIV
H: 50ns/DIV

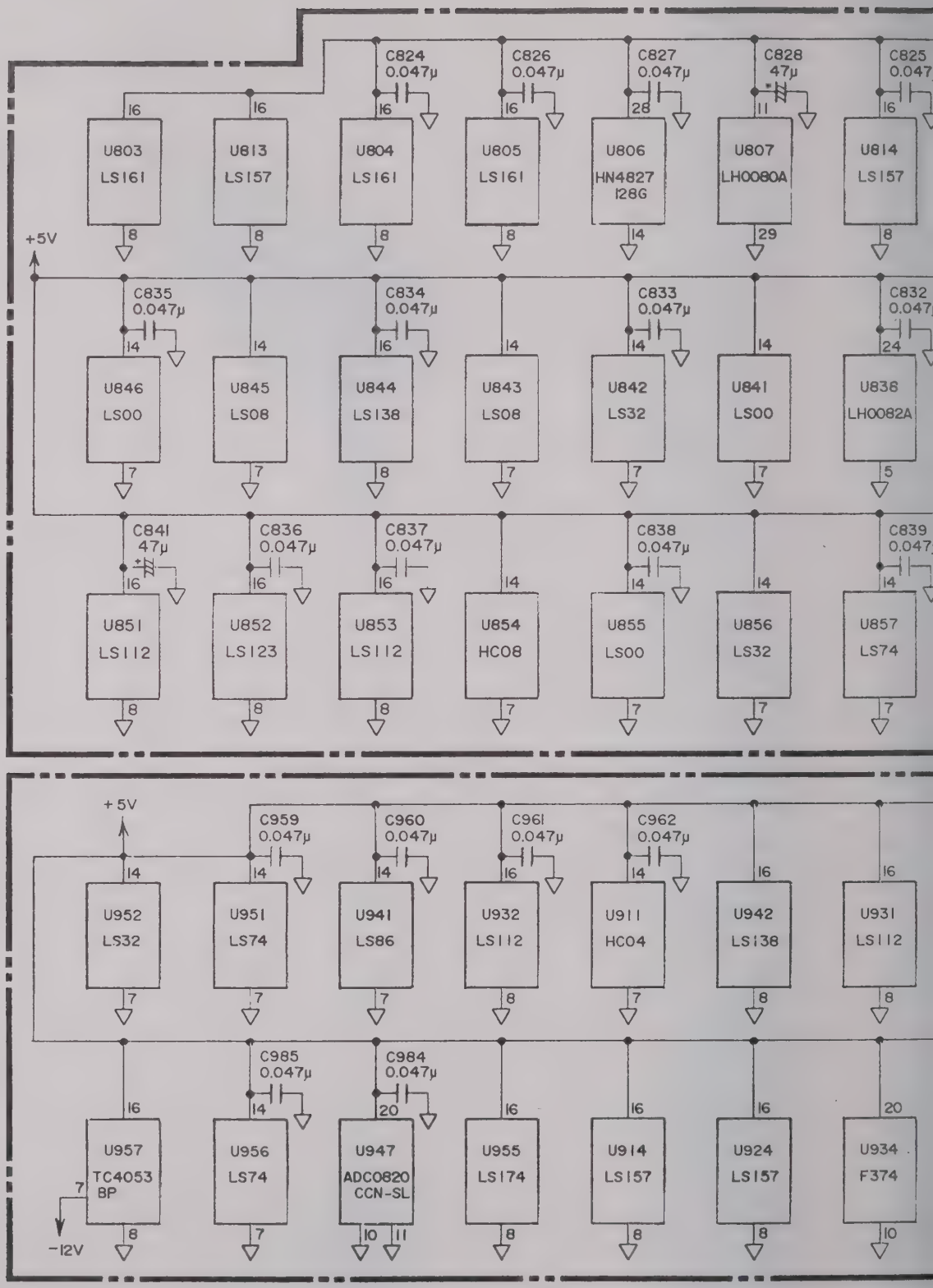
㉞

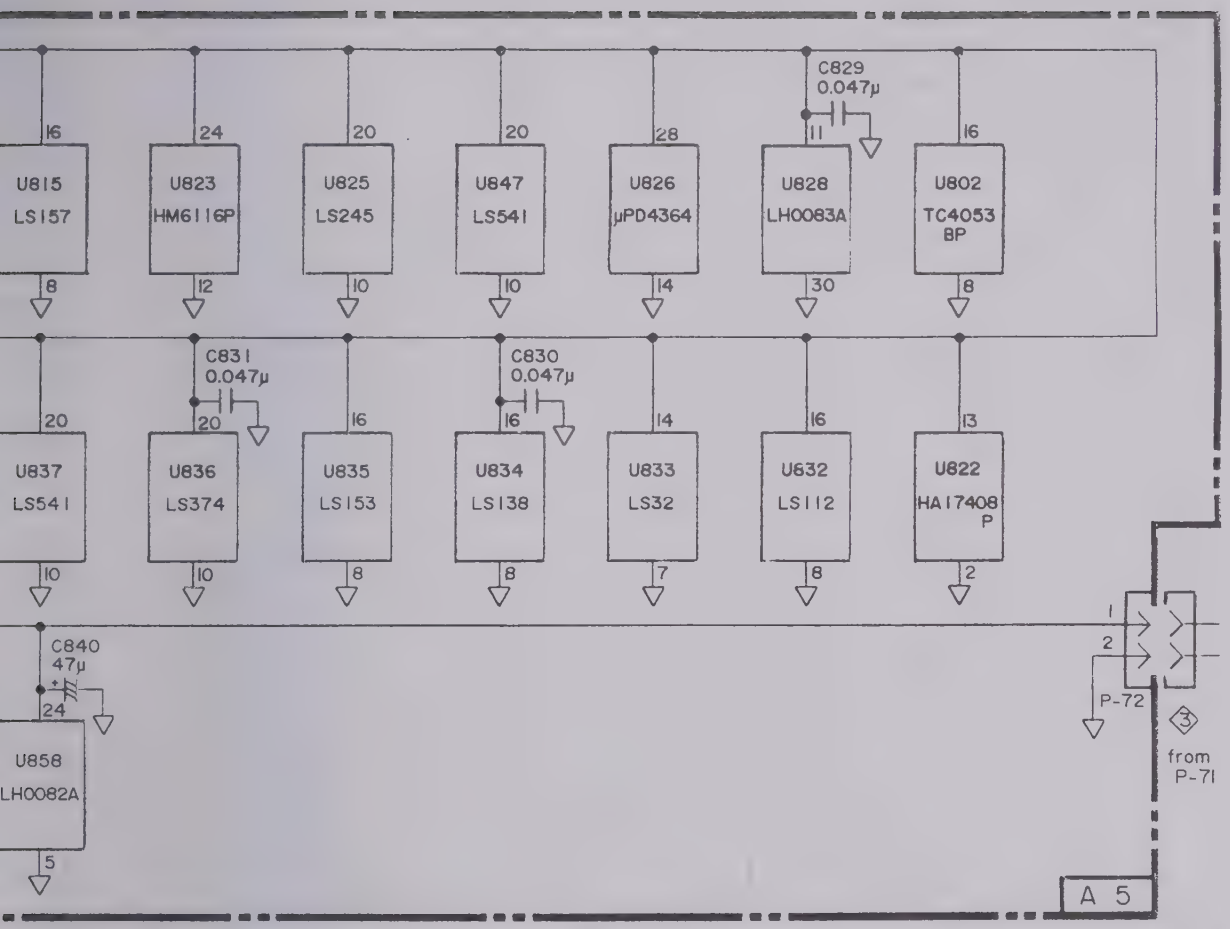


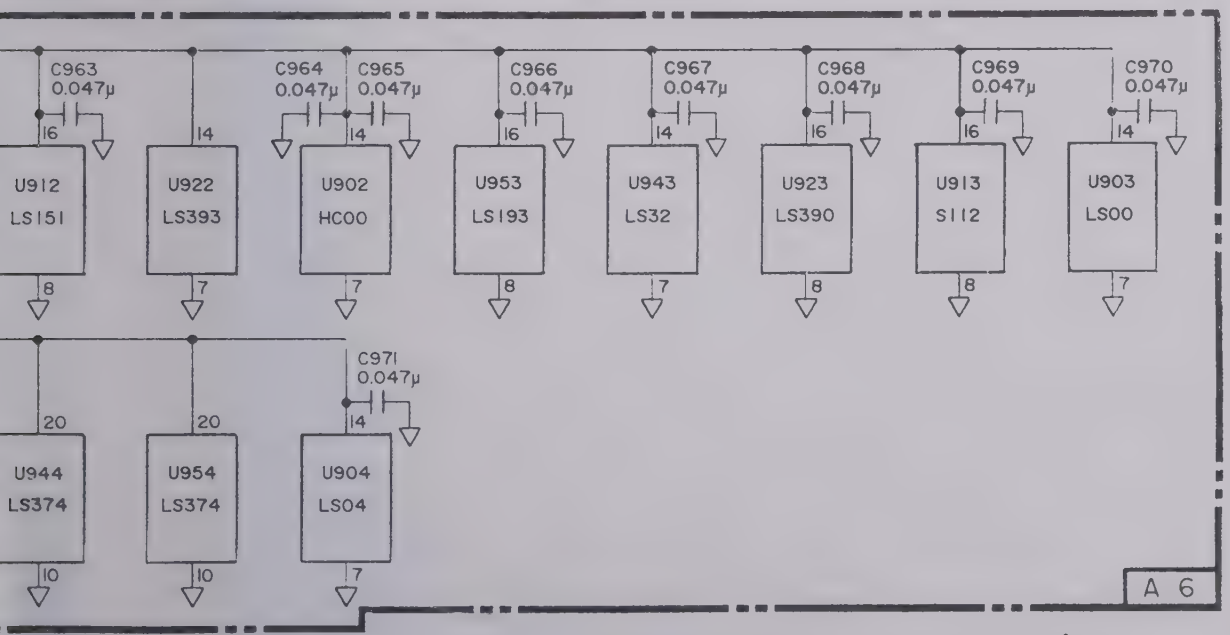
V: 0.5V/DIV
H: 50ns/DIV


A6
REALTIME:( )
from J-8
from J-9
from J-89
J-91
P-91
J-92
P-92
J-93
P-93
U905 TL1591CP
U906 TL1591CP
U958 TA78L005P
U926 MN8028A
U936 MN8028A
U925 MN3104
U935 MN3104
Q900 2SC1907
Q901 2SC1907
Q902 2SC1907
Q903 2SC1907
Q904 2SA1015
Q905 2SA1015
Q907 2SC945
Q908 2SC945
Q909 2SC945
Q910 2SC945
Q911 2SC945
Q912 2SC945
Q913 2SA1015
Q914 2SA1015
Q915 2SA1015
Q916 2SA1015
Q917 2SA1015
Q918 2SA1015
Q922 2SC945
Q328 2SC1907
U903 LS00
U904 LS04
U911 HC04
U913 LS112
U902 HC00
XTL900 25MHz
A3-4
U410 TL497AC
Q441 2SA473
CR450 1G4B42
CR451 C8P040
CR452 RD5.6JB
P-60
P-71
DIGITAL +5V


DSS5040CCD
TIME EXPANDER
5
26282
P-94
P-95
P-96
P-86
P-85
J-95
J-86
J-85
J-84
VERT
X
Z
U947 ADC0820
U956 TC74HC74P
U945 HAI7408
U946 HAI7408
U948 LF353
U949 LF351
U959 TL082
U954 LS374
U944 LS374
U955 LSI74
U957 TC4053BP
U953 LS193
U923 LS390
U914 LSI57
U924 LSI57
U922 LS393
U912 LSI51
U911 HC04 6/6
U911 HC04 1/6
U911 HC04 4/6
U934 F374
U942 LS138
U943 LS32
U952 LS32
U903 LS00
U941 LS86
U951 LS74
U931 LSI12
U932 LSI12
CCD +12V
CCD GND
from P-37
CCD POWER
GND
4MHz
2MHz
500KHz
IORQ
M1
WR
RD
BUSAK
CTCPLS
DMAWAIT
A2
A3
A4
A5
D7
D6
D5
D4
D3
D2
D1
D0
TRIG GATE
LSB


+5V
C824 0.047µ
C826 0.047µ
C827 0.047µ
C828 47µ
C825 0.047
U803 LS161
U813 LS157
U804 LS161
U805 LS161
U806 HN4827 128G
U807 LH0080A
U814 LS157
C835 0.047µ
C834 0.047µ
C833 0.047µ
C832 0.047
U846 LS00
U845 LS08
U844 LS138
U843 LS08
U842 LS32
U841 LS00
U838 LH0082A
C841 47µ
C836 0.047µ
C837 0.047µ
C838 0.047µ
C839 0.047
U851 LS112
U852 LS123
U853 LS112
U854 HC08
U855 LS00
U856 LS32
U857 LS74
+5V
C959 0.047µ
C960 0.047µ
C961 0.047µ
C962 0.047µ
U952 LS32
U951 LS74
U941 LS86
U932 LS112
U911 HC04
U942 LS138
U931 LS112
C985 0.047µ
C984 0.047µ
U957 TC4053 BP
U956 LS74
U947 ADC0820 CCN-SL
U955 LS174
U914 LS157
U924 LS157
U934 F374
-12V





DSS 5040 POWER DISTRIBUTION

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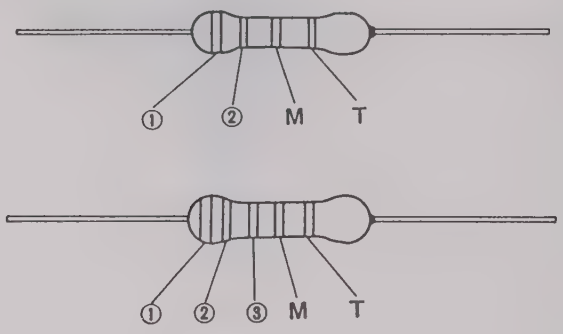
321785

3.4.4 Parts Outside Diameter Diagram

The exterior of electronic components used in this unit, including indications on them, and pin arrangement, is shown below.

1) Indication of resistance value and resistance accuracy.



① ② and ③ – 1st, and 2nd, and 3rd significant figures

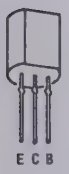
M – multiplier

T – tolerance

COLOR	SIGNIFICANT FIGURES	MULTIPLIER	TOLERANCE
BLACK	0	1	–
BROWN	1	10	±1%
RED	2	10^2 or 100	±2%
ORANGE	3	10^3 or 1K	±3%
YELLOW	4	10^4 or 10K	±4%
GREEN	5	10^5 or 100K	±0.5%
BLUE	6	10^6 or 1M	±0.25%
VIOLET	7	–	±0.1%
GRAY	8	–	–
WHITE	9	–	–
GOLD	–	10^{-1} or 0.1	±5%
SILVER	–	10^{-2} or 0.01	±10%
NONE	–	–	±20%

2) Exterior of semiconductors and pin arrangement

TRANSISTOR

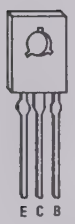


2SA838 2SA844
2SA1015 2SC1834
2SC945 2SC1907
2SC2120

2SA1206

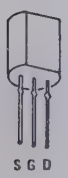
2SC2570

2SA958
2SB834
2AD880



2SB648
2SC1846
2SD668

FET



2SK107

2SK105
2SK117

1G4B42

LED

TLR102KW
TLG102KW

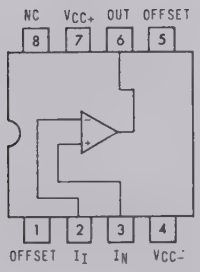
TLG145

DIODE

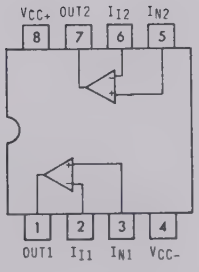
GRV-06SSN

1SS83 1S1588
RD5.6JB RD13FB
HZ2B-3 HZ3C-2
1Z150

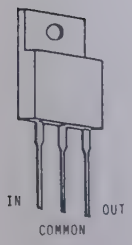
OP AMP



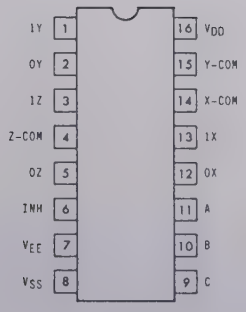
LF13741



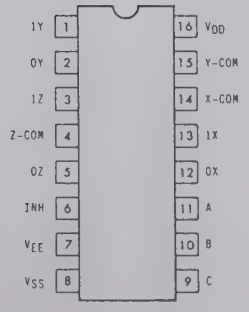
M5218P
TL082
LF353



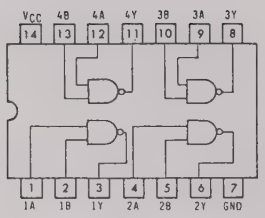
TL78005



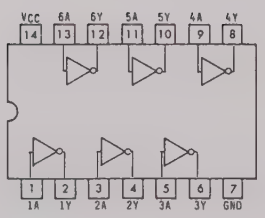
TC4051



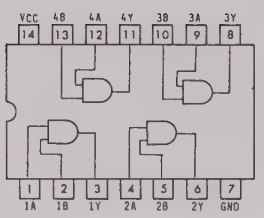
TC4053



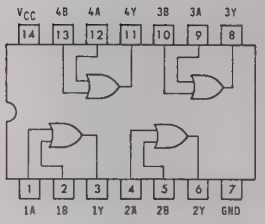
SN74LS00 HD74LS00



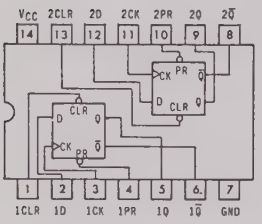
SN74LS04 HD74LS04
MM74HC04



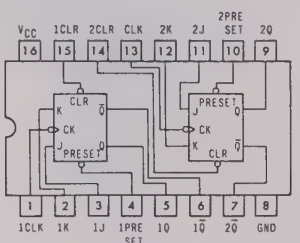
SN74LS08 HD74LS08



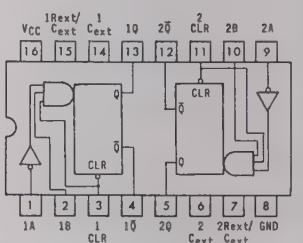
SN74LS32



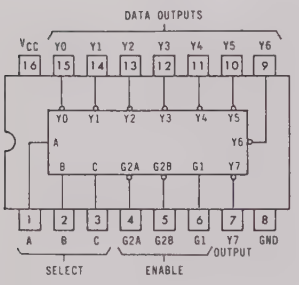
SN74LS74 HD74LS74



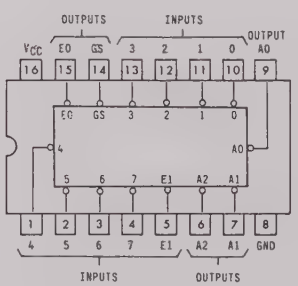
SN74LS112 HD74LS112



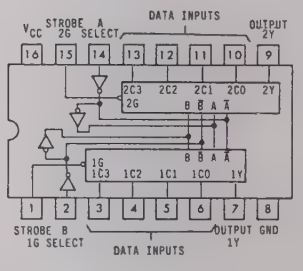
SN74LS123 HD74LS123



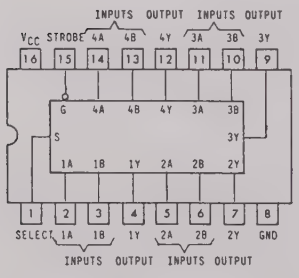
SN74LS138 HD74LS128



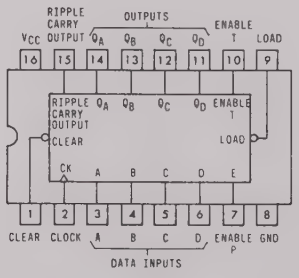
SN74LS148 HD74LS148



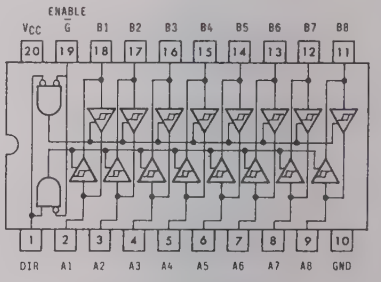
SN74LS153 HD74LS153


INPUTS OUTPUT INPUTS OUTPUT
VCC STROBE 4A 4B 4Y 3A 3B 3Y
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
SELECT 1A 1B 1Y 2A 2B 2Y GND
INPUTS OUTPUT INPUTS OUTPUT

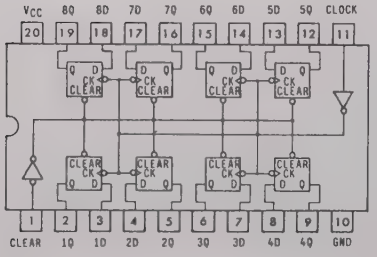
SN74LS157 HD74LS157


RIPPLE CARRY OUTPUT OUTPUTS ENABLE
VCC QA QB QC QD T LOAD
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
CLEAR CLOCK A B C D ENABLE P GND
DATA INPUTS

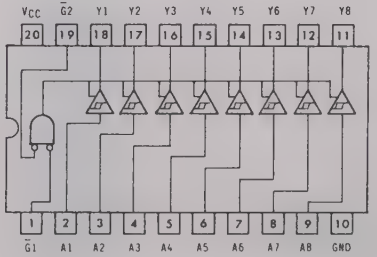
SN74LS161 HD74LS161



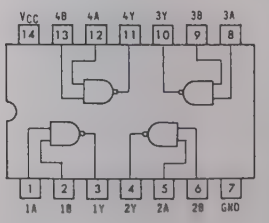
SN74LS245 HD74LS245



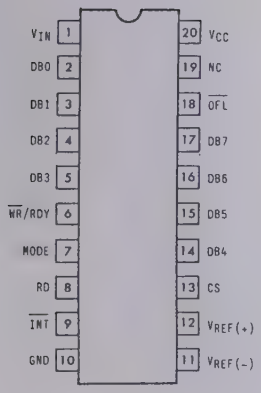
SN74LS273 HD74LS273



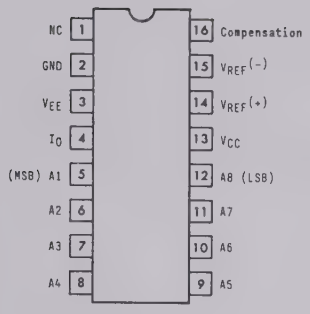
SN74LS541 HD74LS541



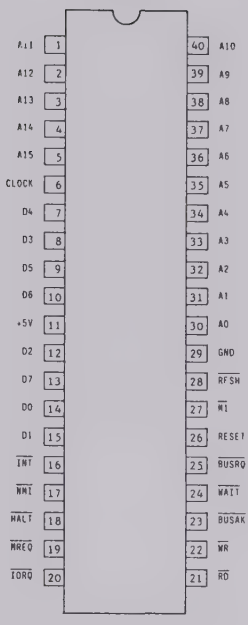
TC4011BP



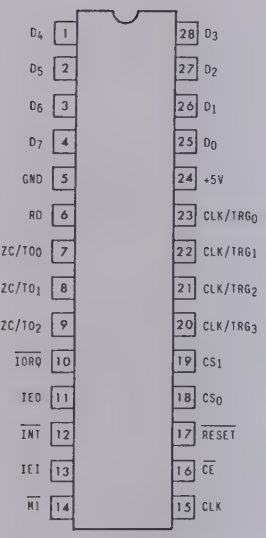
ADC0820



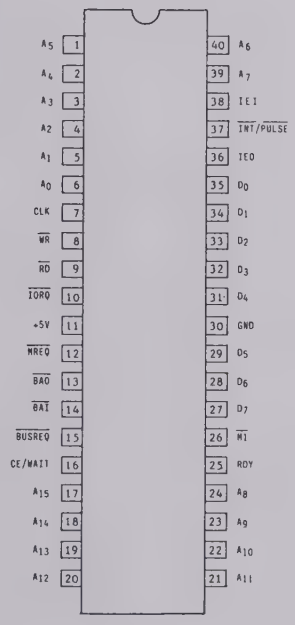
HA1740BP



Z80A-CPU

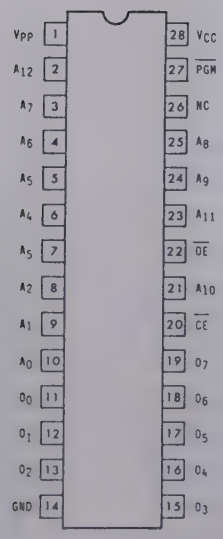


Z80-CTC

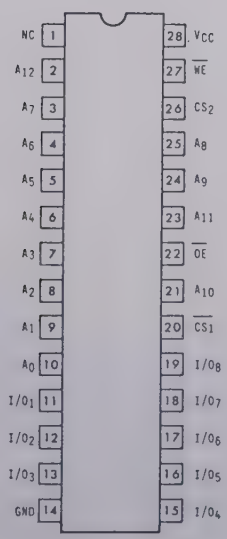


Z80-DMA

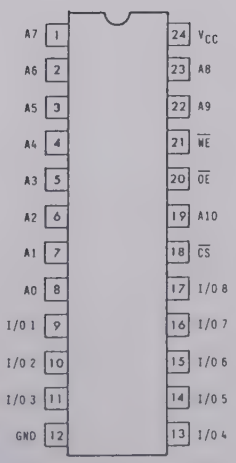
MEMORY



HN482764/G



HM6264P-15



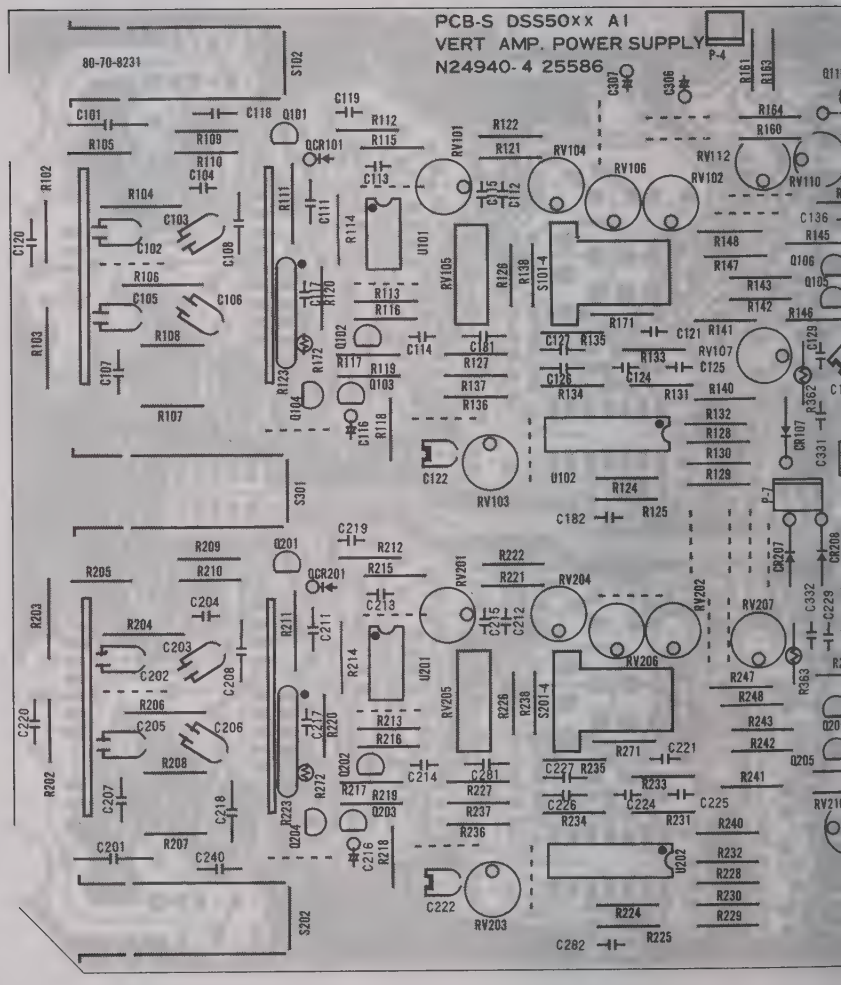
HM6116LP-2

SEMICONDUCTOR LEAD CONFIGURATION

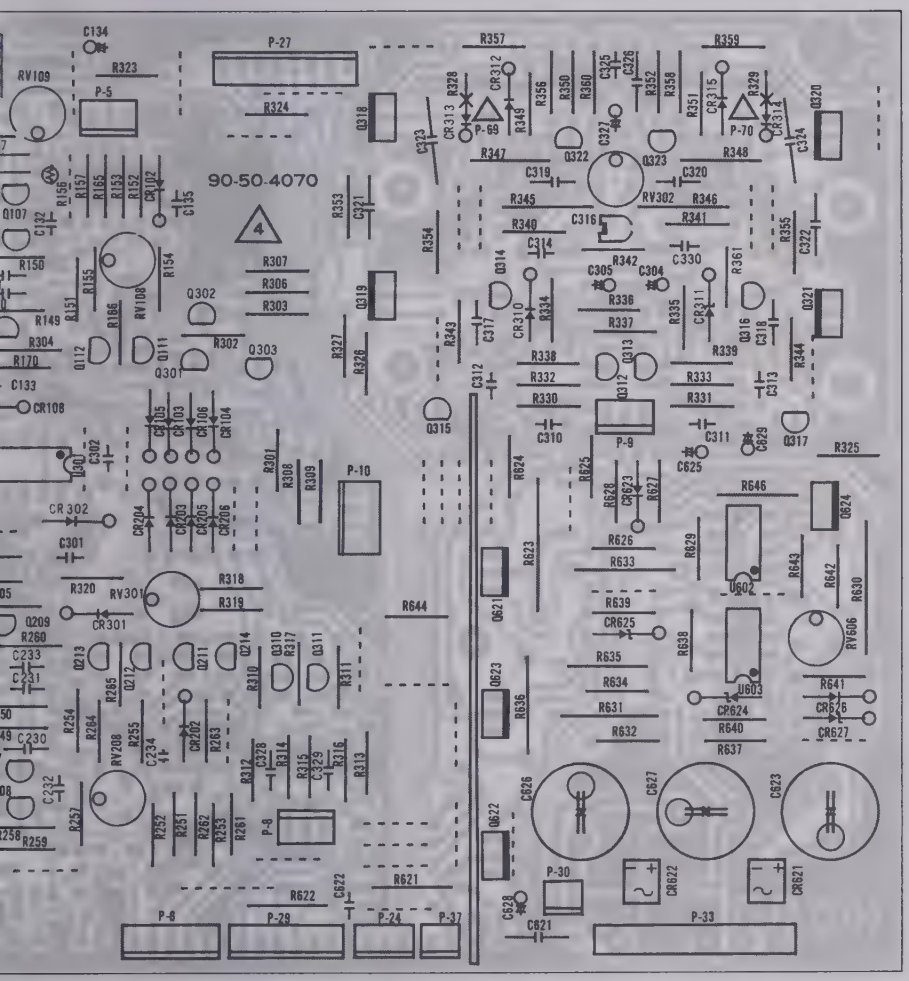
3.4.5 Parts Location

This section describes location of the parts on the boards used in the oscilloscope.

1) A1 VERT AMP & POWER SUPPLY
2) A2 SWEEP & H. V
3) A5 PROCESSING UNIT
4) A6 CCD TIME EXPANDER
5) A3 STORAGE MODE SWITCH
6) A4 CAL & CRT CONTROL
7) A7 VERT MODE SWITCH

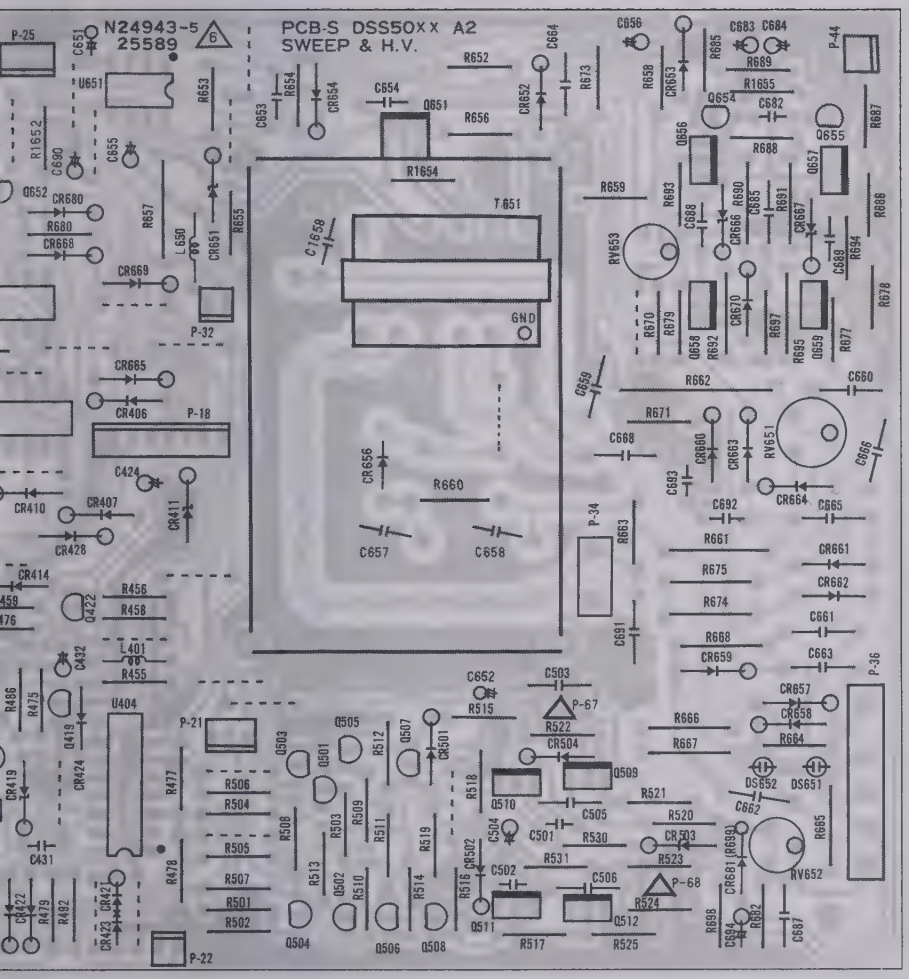


1) A1 VERT AMP & PC

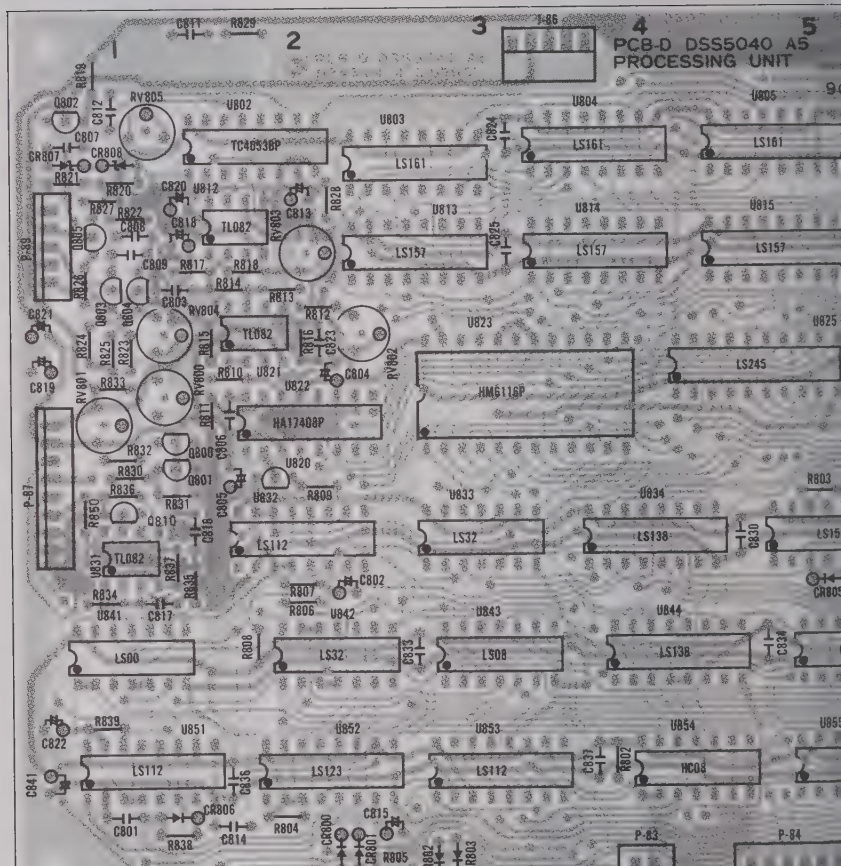


R SUPPLY (Parts side view)

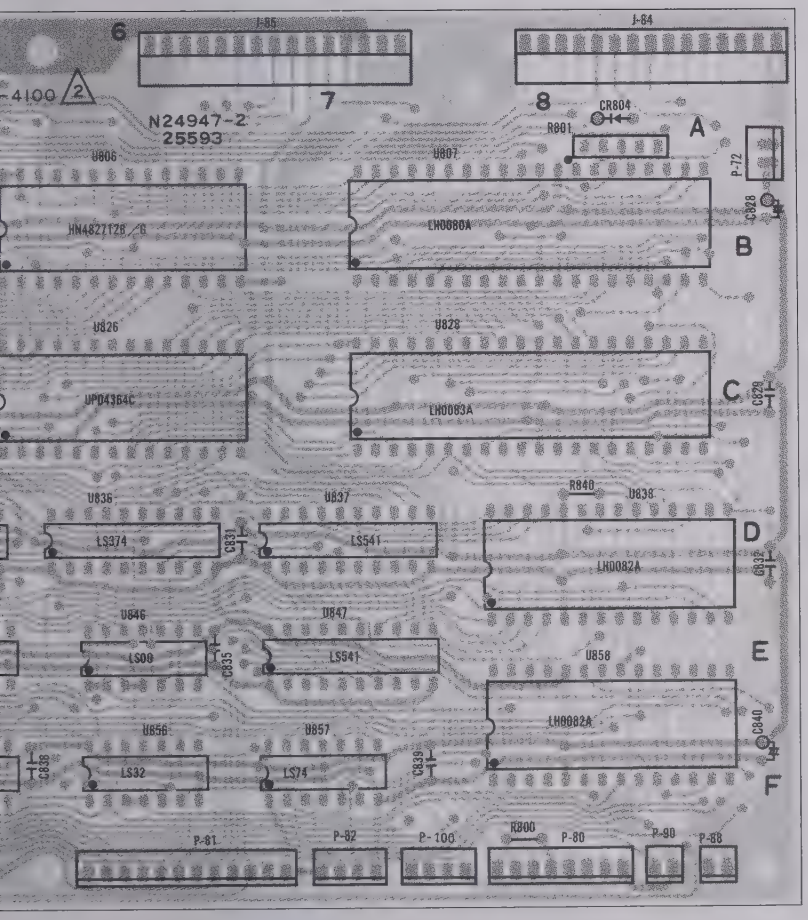
2) A2 SWEEP & H.V



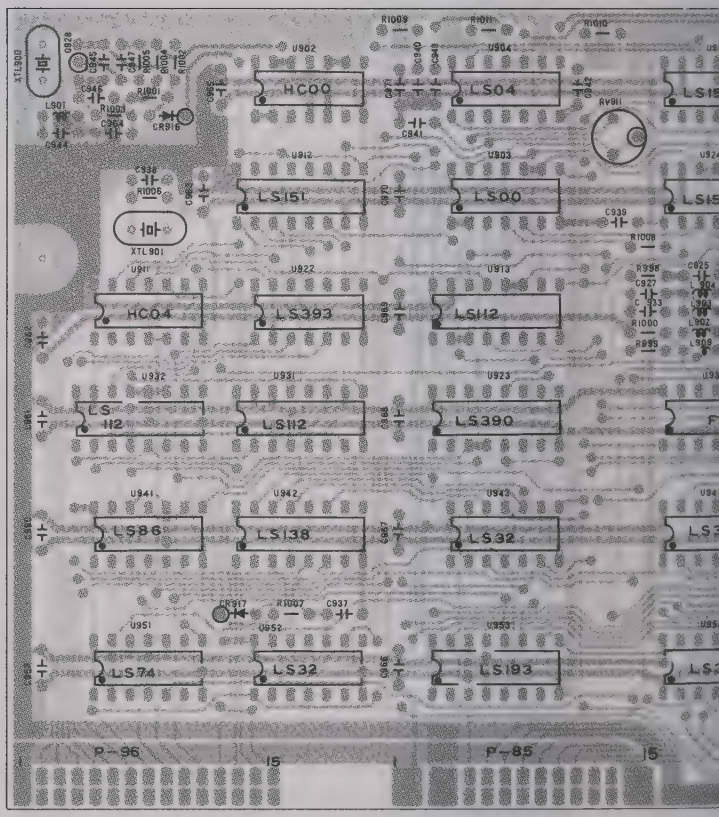
(Parts side view)



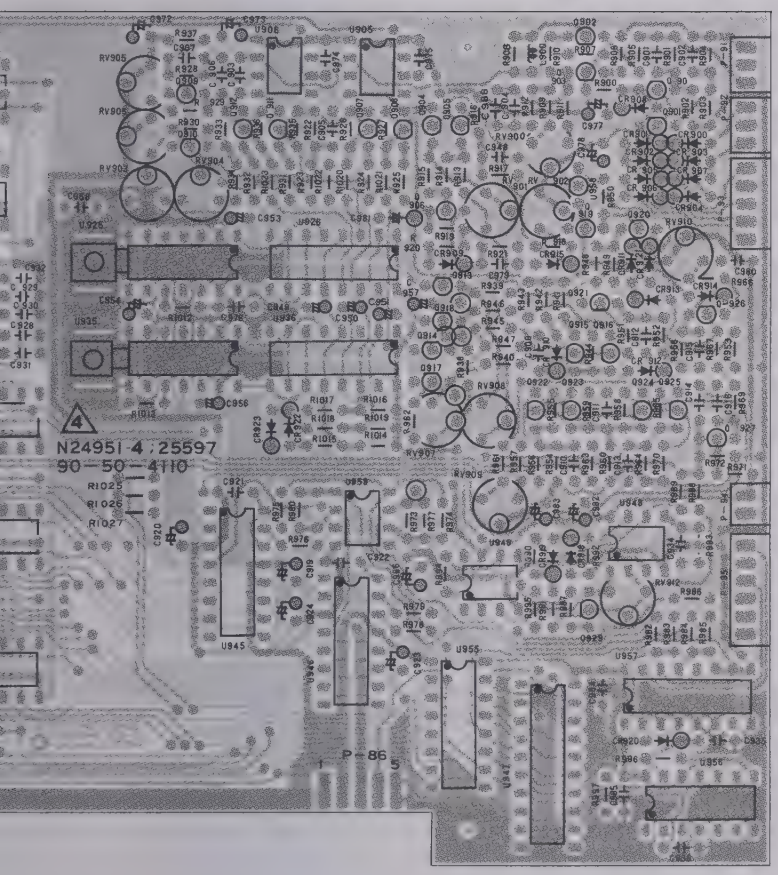
3) A5 PROCESSING UNIT



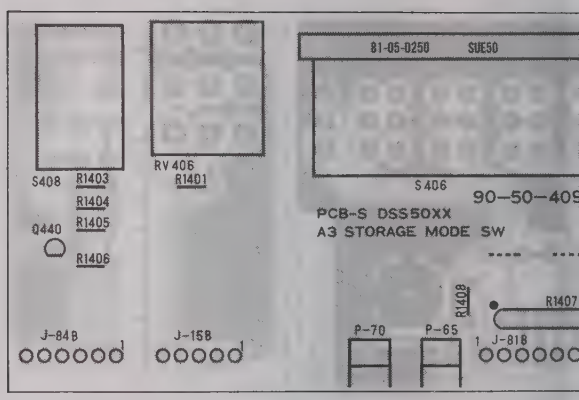
(Parts side view)



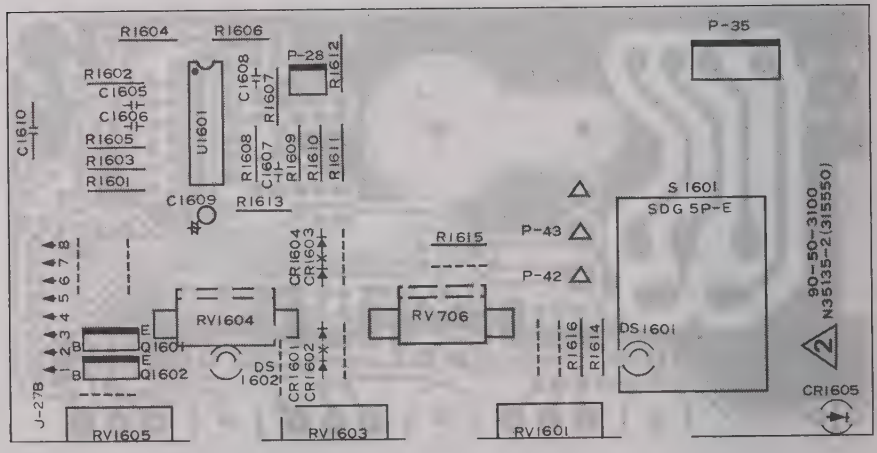
4) A6 CCD TIME EXPA



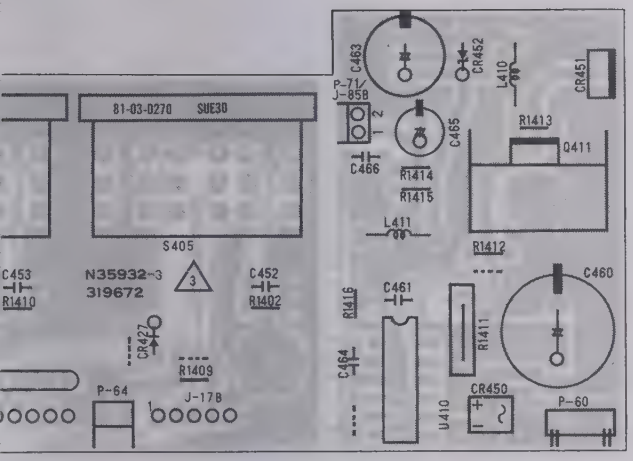
(Parts side view)



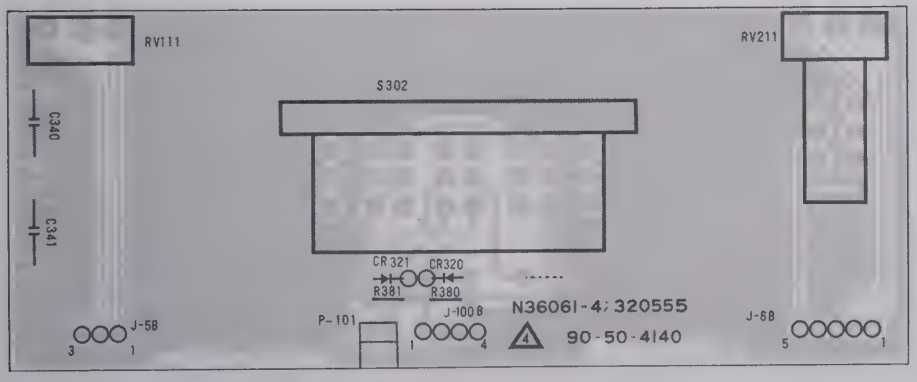
5) A3 STORAGE MODE



6) A4 CAL & CRT CONTROL (Parts side view)



WITCH (Parts side view)



7) A7 VERT MODE SWITCH (Parts side view)

3.4.6 Electrical Parts List

The parts used in this Instrument are listed in units of assemblies.
The 3-12 lists the assemblies and their contents.

Assembly Name	Contents
B ASSEMBLY	Parts not mounted on PC board.
A1 ASSEMBLY	Parts mounted on A1 board. (VERT AMP & POWER SUPPLY)
A2 ASSEMBLY	Parts mounted on A2 board. (SWEEP & H.V)
A3 ASSEMBLY	Parts mounted on A3 board. (STORAGE MODE SWITCH)
A4 ASSEMBLY	Parts mounted on A4 board. (CAL & CRT CONTROL)
A5 ASSEMBLY	Parts mounted on A5 board. (PROCESSING UNIT)
A6 ASSEMBLY	Parts mounted on A6 board. (CCD TIME EXPANDER)
A7 ASSEMBLY	Parts mounted on A7 board. (VERT MODE SWITCH)
AHV ASSEMBLY	Parts mounted on HIGH VOLTAGE UNIT board.

Table 3-12 Assemblies

Mnemonic symbols are used for the explanation of parts. Table 3-13 lists the Mnemonic symbols.

Mnemonic symbol	Meaning
CER	CERAMIC
C FILM	CARBON FILM
C COMP	CARBON COMPOSITION
CRT	CATHODE RAY TUBE
ELECT	ELECTROLYTIC
FET	FIELD EFFECT TRANSISTOR
FXD	FIXED
LED	LIGHT EMITTING DIODE
M FILM	METAL FILM
M GLAZE	METAL GLAZE
M OX	METAL OXIDE
M PLSTC FILM	METALLIZED PLASTIC FILM
SI	SILICON
TANT ELECT	TANTALUM ELECTROLYTIC
VAR	VARIABLE
WW	WIRE WOUND
*	OPTIMUM VALUE SELECTED AT FACTORY AVERAGE VALUE SHOWN. (PARTY MAY BE OMITTED)

Table 3-13 Mnemonic symbols

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
A ASSEMBLY				
B ASSEMBLY				
C110	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C210	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C601	52-77-1010	FXD CER 1000PF 250VAC	FOR UL & CSA	
C602	52-77-1010	FXD CER 1000PF 250VAC	FOR UL & CSA	
C603	52-96-1140	FXD COMP 0.68PF 10% 500V		
CR425	37-00-0092	LAMP LED RED	TOSHIBA	TLR102KW
CR1401	37-00-0082	LAMP LED RED	TOSHIBA	TLR102KW
CR1402	37-00-0082	LAMP LED RED	TOSHIBA	TLR102KW
DL301	91-90-0003	DELAY LINE 1.3M Z=186 OHM		
R101	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		NAS1/4S
R201	40-27-0222	FXD C FILM 22 OHM 5% 1/4W		NAS1/4S
R400	40-27-0562	FXD C FILM 56 OHM 5% 1/4W		NAS1/4S
RV405	45-35-3107	VAR C COMP 10K OHM		V16L4N15KC
T601	60-44-0180	POWER TRANS FOR DSS 5040	KIKUSUI	S8504231
V601	21-46-0612	CATHODE RAY TUBE	TOSHIBA	150CTB31
A1 ASSEMBLY				
C101	50-96-3590	FXD PLSTC FILM 0.022MF 20% 630WV		
C102	57-10-1191	VAR CER 3-10PF		
C103	57-10-1181	VAR CER 3-6PF		
C104	52-06-2165	FXD CER 33PF 10% 500V TYPE1		
C105	57-10-1191	VAR CER 3-10PF		
C106	57-10-1181	VAR CER 3-6PF		
C107	52-06-2274	FXD CER 270P 10% 50V TYPE1		
C108	52-06-2274	FXD CER 270P 10% 50V TYPE1		
C111	50-87-0510	FXD PLSTC FILM 2200PF 20% 400WV		
C112	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C113	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		
C114	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C115	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C116	54-40-1200	FXD ELECT 10MF 50WV		
C118	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C119	52-06-2051	FXD CER 5P 10% 50V TYPE1		
C120	52-06-2145	FXD CER 22PF 10% 500V TYPE1		
C121	52-06-2265	FXD CER 220PF 10% 50V TYPE1		
C122	57-10-1203	VAR CER 5-20PF		
C124	52-06-3051	FXD CER 5PF 10% 500V TYPE1		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040
C125	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C126	52-06-2215	FXD CER 82PF 10% 500V TYPE1
C127	52-06-2215	FXD CER 82PF 10% 500V TYPE1
C128	57-10-1223	VAR CER 8-50PF
C129	52-06-2165	FXD CER 33PF 10% 500V TYPE1
C130	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C131	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C132	52-06-2204	FXD CER 68P 10% 50V TYPE1
C133	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C134	54-40-1200	FXD ELECT 10MF 50WV
C135	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C136	52-06-2010	FXD CER 1PF 10% 50V TYPE1
C140	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C181	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C182	52-06-2051	FXD CER 5P 10% 50V TYPE1
C201	50-96-3590	FXD PLSTC FILM 0.022MF 20% 630WV
C202	57-10-1191	VAR CER 3-10PF
C203	57-10-1181	VAR CER 3-6PF
C204	52-06-2165	FXD CER 33PF 10% 500V TYPE1
C205	57-10-1191	VAR CER 3-10PF
C206	57-10-1181	VAR CER 3-6PF
C207	52-06-2274	FXD CER 270P 10% 50V TYPE1
C208	52-06-2274	FXD CER 270P 10% 50V TYPE1
C211	50-87-0510	FXD PLSTC FILM 2200PF 20% 400WV
C212	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C213	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C214	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C215	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C216	54-40-1200	FXD ELECT 10MF 50WV
C218	52-06-2265	FXD CER 220PF 10% 50V TYPE1
C219	52-06-2051	FXD CER 5P 10% 50V TYPE1
C220	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C221	52-06-2265	FXD CER 220PF 10% 50V TYPE1
C222	57-10-1203	VAR CER 5-20PF
C224	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C225	52-06-3051	FXD CER 5PF 10% 500V TYPE1
C226	52-06-2215	FXD CER 82PF 10% 500V TYPE1
C227	52-06-2215	FXD CER 82PF 10% 500V TYPE1
C228	57-10-1223	VAR CER 8-50PF
C229	52-06-2165	FXD CER 33PF 10% 500V TYPE1
C230	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C231	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C232	52-06-2204	FXD CER 68P 10% 50V TYPE1
C233	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C234	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C240	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C281	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C282	52-06-2051	FXD CER 5P 10% 50V TYPE1
C301	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C302	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C304	54-40-1200	FXD ELECT 10MF 50WV
C305	54-40-1200	FXD ELECT 10MF 50WV
C306	54-30-1970	FXD ELECT 100MF 25WV
C307	54-30-1970	FXD ELECT 100MF 25WV

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040		
C312	52-06-2125	FXD CER 15PF 10% 500V TYPE1		
C313	52-06-2125	FXD CER 15PF 10% 500V TYPE1		
C314	52-06-2010	FXD CER 1PF 10% 50V TYPE1		
C316	57-10-1203	VAR CER 5-20PF		
C317	50-67-0030	FXD PLSTC FILM 0.01MF 10% 100WV		
C318	50-67-0030	FXD PLSTC FILM 0.01MF 10% 100WV		
C319	52-96-1140	FXD COMP 0.68PF 10% 500V		
C320	52-96-1140	FXD COMP 0.68PF 10% 500V		
C321	50-77-3500	FXD PLSTC FILM 0.047MF 20% 250WV		
C322	50-77-3500	FXD PLSTC FILM 0.047MF 20% 250WV		
C323	50-96-3590	FXD PLSTC FILM 0.022MF 20% 630WV		
C324	50-96-3590	FXD PLSTC FILM 0.022MF 20% 630WV		
C325	50-67-0050	FXD PLSTC FILM 0.047MF 10% 100WV		
C326	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2		
C327	54-60-1740	FXD ELECT 1MF 160WV		
C328	52-06-2155	FXD CER 27P 10% 50V TYPE1		
C329	52-06-2155	FXD CER 27P 10% 50V TYPE1		
C330	52-06-2051	FXD CER 5P 10% 50V TYPE1		
C331	52-06-2155	FXD CER 27P 10% 50V TYPE1		
C332	52-06-2155	FXD CER 27P 10% 50V TYPE1		
C621	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C622	50-67-0040	FXD PLSTC FILM 0.022MF 10% 100WV		
C623	54-60-1730	FXD ELECT 47MF 200WV		
C625	54-60-1740	FXD ELECT 1MF 160WV		
C626	54-30-1840	FXD ELECT 2200MF 25WV		
C627	54-30-1830	FXD ELECT 1000MF 25WV		
C628	54-30-1960	FXD ELECT 47MF 25WV		
C629	54-70-1080	FXD ELECT 2.2MF 250WV		
CR102	32-92-0033	ZENER VZ=3.2 - 3.4V	HITACHI	HZ3C-2
CR103	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR104	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR105	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR106	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR107	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR108	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR161	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR202	32-92-0033	ZENER VZ=3.2 - 3.4V	HITACHI	HZ3C-2
CR203	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR204	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR205	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR206	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR207	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR208	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR301	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR302	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR310	32-92-0022	ZENER VZ=2.1 - 2.3V	HITACHI	HZ2B-3
CR311	32-92-0022	ZENER VZ=2.1 - 2.3V	HITACHI	HZ2B-3
CR312	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR313	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR314	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR315	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR621	32-90-2110	DIODE BRIGE VRM=400V IO=1A	TOSHIBA	1G4B42
CR622	32-90-2110	DIODE BRIGE VRM=400V IO=1A	TOSHIBA	1G4B42

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040		
CR623	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR624	32-92-0130	ZENER VZ=12.4-13.1V P=0.4W	NEC	RD13JB1
CR625	32-92-0130	ZENER VZ=12.4-13.1V P=0.4W	NEC	RD13JB1
CR626	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR627	32-91-1805	ZENER VZ=5.48-5.76V P=0.4W	NEC	RD5.6JSB2
L301	67-95-0010	INDUCTOR L-2874		
L302	67-95-0010	INDUCTOR L-2874		
Q101	31-20-1073	FET IDSS=4.5-7.7MA	SONY	2SK107-3
Q102	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q103	30-11-0051	TR SI PNP	NEC	2SA1005-L
Q104	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q105	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q106	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q107	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q108	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q109	30-32-1201	TR SI NPN	TOSHIBA	2SC2120-Y
Q110	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q111	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q112	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q201	31-20-1073	FET IDSS=4.5-7.7MA	SONY	2SK107-3
Q202	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q203	30-11-0051	TR SI PNP	NEC	2SA1005-L
Q204	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q205	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q206	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q207	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q208	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q209	30-32-1201	TR SI NPN	TOSHIBA	2SC2120-Y
Q211	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q212	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q213	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q214	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q301	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q302	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q303	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q310	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q311	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q312	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q313	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q314	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q315	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q316	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q317	30-11-2061	TR SI PNP	NEC	2SA1206-L
Q318	30-11-1441	TR SI PNP	TOSHIBA	2SA1144-O
Q319	30-32-7041	TR SI NPN	TOSHIBA	2SC2704-O
Q320	30-11-1441	TR SI PNP	TOSHIBA	2SA1144-O
Q321	30-32-7041	TR SI NPN	TOSHIBA	2SC2704-O
Q322	30-32-5700	TR SI NPN	NEC	2SC2570
Q323	30-32-5700	TR SI NPN	NEC	2SC2570
Q621	30-10-9580	TR SI PNP	KIKUSUI	S8309591
Q622	30-20-8341	TR SI PNP	TOSHIBA	2SB834-Y
Q623	30-40-8802	TR SI NPN	TOSHIBA	2SD880-Y

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040		
Q624	30-40-8802	TR SI NPN		TOSHIBA	2SD880-Y
QCR101	30-31-9071	TR SI NPN		HITACHI	2SC1907
QCR201	30-31-9071	TR SI NPN		HITACHI	2SC1907
R102	40-27-0332	FXD C FILM	33 OHM 5% 1/4W		NAS1/4S
R103	42-33-0420	FXD M FILM	1M OHM 1% 1/2W		RN1/2S
R104	42-33-0390	FXD M FILM	900K OHM .5% 1/2W		RN1/2S
R105	42-82-4111	FXD M FILM	111K OHM .5% 1/4W		RN1/4S
R106	42-33-0400	FXD M FILM	990K OHM .5% 1/2W		RN1/2S
R107	42-82-3101	FXD M FILM	10.1K OHM .5% 1/4W		RN1/4S
R108	40-27-0152	FXD C FILM	15 OHM 5% 1/4W		NAS1/4S
R109	40-27-0682	FXD C FILM	68 OHM 5% 1/4W		NAS1/4S
R110	40-27-0152	FXD C FILM	15 OHM 5% 1/4W		NAS1/4S
R111	40-37-4471	FXD C FILM	470K OHM 5% 1/2W		
R112	40-27-2122	FXD C FILM	1.2K OHM 5% 1/4W		
R113	40-27-2102	FXD C FILM	1K OHM 5% 1/4W		
R114	40-27-1392	FXD C FILM	390 OHM 5% 1/4W		
R115	40-27-1102	FXD C FILM	100 OHM 5% 1/4W		NAS1/4S
R116	40-27-1682	FXD C FILM	680 OHM 5% 1/4W		
R117	40-27-2392	FXD C FILM	3.9K OHM 5% 1/4W		
R118	40-27-2822	FXD C FILM	8.2K OHM 5% 1/4W		
R119	40-27-2562	FXD C FILM	5.6K OHM 5% 1/4W		
R120	40-27-2122	FXD C FILM	1.2K OHM 5% 1/4W		
R121	40-27-0102	FXD C FILM	10 OHM 5% 1/4W		NAS1/4S
R122	40-27-0102	FXD C FILM	10 OHM 5% 1/4W		NAS1/4S
R123	44-04-0000	FXD M GLAZE	R-NETWORK	KIKUSUI	S8109001
R124	42-83-1120	FXD M FILM	120 OHM 1% 1/4W		
R125	42-83-1120	FXD M FILM	120 OHM 1% 1/4W		
R126	40-27-3472	FXD C FILM	47K OHM 5% 1/4W		
R127	40-27-1102	FXD C FILM	100 OHM 5% 1/4W		NAS1/4S
R128	40-27-2562	FXD C FILM	5.6K OHM 5% 1/4W		
R129	40-27-2562	FXD C FILM	5.6K OHM 5% 1/4W		
R130	40-27-1682	FXD C FILM	680 OHM 5% 1/4W		
R131	42-83-1470	FXD M FILM	470 OHM 1% 1/4W		
R132	40-27-1272	FXD C FILM	270 OHM 5% 1/4W		
R133	42-83-1470	FXD M FILM	470 OHM 1% 1/4W		
R134	42-83-0560	FXD M FILM	56 OHM 1% 1/4W		
R135	42-83-0560	FXD M FILM	56 OHM 1% 1/4W		
R136	40-27-0272	FXD C FILM	27 OHM 5% 1/4W		NAS1/4S
R137	40-27-0272	FXD C FILM	27 OHM 5% 1/4W		NAS1/4S
R138	40-27-3472	FXD C FILM	47K OHM 5% 1/4W		
R140	42-83-1680	FXD M FILM	680 OHM 1% 1/4W		
R141	42-83-1680	FXD M FILM	680 OHM 1% 1/4W		
R142	40-27-0222	FXD C FILM	22 OHM 5% 1/4W		NAS1/4S
R143	40-27-0222	FXD C FILM	22 OHM 5% 1/4W		NAS1/4S
R144	40-27-1152	FXD C FILM	150 OHM 5% 1/4W		
R145	40-27-1152	FXD C FILM	150 OHM 5% 1/4W		
R146	42-83-1120	FXD M FILM	120 OHM 1% 1/4W		
R147	40-27-2152	FXD C FILM	1.5K OHM 5% 1/4W		
R148	40-27-2152	FXD C FILM	1.5K OHM 5% 1/4W		
R149	40-27-1182	FXD C FILM	180 OHM 5% 1/4W		
R150	40-27-1182	FXD C FILM	180 OHM 5% 1/4W		
R151	40-27-1102	FXD C FILM	100 OHM 5% 1/4W		NAS1/4S

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040
R152	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R153	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R154	40-27-0472	FXD C FILM 47 OHM 5% 1/4W	NAS1/4S
R155	40-27-0472	FXD C FILM 47 OHM 5% 1/4W	NAS1/4S
R156	38-00-0070	THERMISTOR 200 OHM TOSHIBA	D22A
R157	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	NAS1/4S
R158	42-83-2100	FXD M FILM 1K OHM 1% 1/4W	
R159	42-83-2100	FXD M FILM 1K OHM 1% 1/4W	
R160	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W	
R161	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R162	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S
R163	40-27-0472	FXD C FILM 47 OHM 5% 1/4W	NAS1/4S
R164	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W	
R165	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R166	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	NAS1/4S
R167	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R170	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R171	40-27-0000	JUMPER PARTS	NAS1/4
R202	40-27-0332	FXD C FILM 33 OHM 5% 1/4W	NAS1/4S
R203	42-33-0420	FXD M FILM 1M OHM 1% 1/2W	RN1/2S
R204	42-33-0390	FXD M FILM 900K OHM .5% 1/2W	RN1/2S
R205	42-82-4111	FXD M FILM 111K OHM .5% 1/4W	RN1/4S
R206	42-33-0400	FXD M FILM 990K OHM .5% 1/2W	RN1/2S
R207	42-82-3101	FXD M FILM 10.1K OHM .5% 1/4W	RN1/4S
R208	40-27-0152	FXD C FILM 15 OHM 5% 1/4W	NAS1/4S
R209	40-27-0682	FXD C FILM 68 OHM 5% 1/4W	NAS1/4S
R210	40-27-0152	FXD C FILM 15 OHM 5% 1/4W	NAS1/4S
R211	40-37-4471	FXD C FILM 470K OHM 5% 1/2W	
R212	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W	
R213	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R214	40-27-1392	FXD C FILM 390 OHM 5% 1/4W	
R215	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	NAS1/4S
R216	40-27-1682	FXD C FILM 680 OHM 5% 1/4W	
R217	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W	
R218	40-27-2822	FXD C FILM 8.2K OHM 5% 1/4W	
R219	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R220	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W	
R221	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S
R222	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S
R223	44-04-0000	FXD M GLAZE R-NETWORK KIKUSUI	S8109001
R224	42-83-1120	FXD M FILM 120 OHM 1% 1/4W	
R225	42-83-1120	FXD M FILM 120 OHM 1% 1/4W	
R226	40-27-3472	FXD C FILM 47K OHM 5% 1/4W	
R227	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	NAS1/4S
R228	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R229	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R230	40-27-1682	FXD C FILM 680 OHM 5% 1/4W	
R231	42-83-1470	FXD M FILM 470 OHM 1% 1/4W	
R232	40-27-1272	FXD C FILM 270 OHM 5% 1/4W	
R233	42-83-1470	FXD M FILM 470 OHM 1% 1/4W	
R234	42-83-0560	FXD M FILM 56 OHM 1% 1/4W	
R235	42-83-0560	FXD M FILM 56 OHM 1% 1/4W	
R236	40-27-0272	FXD C FILM 27 OHM 5% 1/4W	NAS1/4S
R237	40-27-0272	FXD C FILM 27 OHM 5% 1/4W	NAS1/4S

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040
R238	40-27-3472	FXD C FILM 47K OHM 5% 1/4W	
R240	42-83-1680	FXD M FILM 680 OHM 1% 1/4W	
R241	42-83-1680	FXD M FILM 680 OHM 1% 1/4W	
R242	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	NAS1/4S
R243	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	NAS1/4S
R244	40-27-1152	FXD C FILM 150 OHM 5% 1/4W	
R245	40-27-1152	FXD C FILM 150 OHM 5% 1/4W	
R246	42-83-1120	FXD M FILM 120 OHM 1% 1/4W	
R247	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W	
R248	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W	
R249	40-27-1182	FXD C FILM 180 OHM 5% 1/4W	
R250	40-27-1182	FXD C FILM 180 OHM 5% 1/4W	
R251	40-27-1102	FXD C FILM 100 OHM 5% 1/4W	NAS1/4S
R252	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R253	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W	
R254	40-27-0472	FXD C FILM 47 OHM 5% 1/4W	NAS1/4S
R255	40-27-0472	FXD C FILM 47 OHM 5% 1/4W	NAS1/4S
R256	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R257	40-27-0822	FXD C FILM 82 OHM 5% 1/4W	NAS1/4S
R258	42-83-2100	FXD M FILM 1K OHM 1% 1/4W	
R259	42-83-2100	FXD M FILM 1K OHM 1% 1/4W	
R260	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R261	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W	
R262	40-27-2682	FXD C FILM 6.8K OHM 5% 1/4W	
R263	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R264	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W	
R265	40-27-0222	FXD C FILM 22 OHM 5% 1/4W	NAS1/4S
R271	40-27-0000	JUMPER PARTS	NAS1/4
R301	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R302	40-27-3222	FXD C FILM 22K OHM 5% 1/4W	
R303	40-27-3222	FXD C FILM 22K OHM 5% 1/4W	
R304	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R305	40-27-2102	FXD C FILM 1K OHM 5% 1/4W	
R306	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W	
R307	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W	
R308	40-27-3472	FXD C FILM 47K OHM 5% 1/4W	
R309	40-27-3472	FXD C FILM 47K OHM 5% 1/4W	
R310	42-83-1470	FXD M FILM 470 OHM 1% 1/4W	
R311	42-83-1470	FXD M FILM 470 OHM 1% 1/4W	
R312	40-27-1822	FXD C FILM 820 OHM 5% 1/4W	
R313	40-27-1822	FXD C FILM 820 OHM 5% 1/4W	
R314	40-27-0822	FXD C FILM 82 OHM 5% 1/4W	NAS1/4S
R315	40-27-0822	FXD C FILM 82 OHM 5% 1/4W	NAS1/4S
R316	40-27-0332	FXD C FILM 33 OHM 5% 1/4W	NAS1/4S
R317	40-27-1332	FXD C FILM 330 OHM 5% 1/4W	
R318	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R319	40-27-1222	FXD C FILM 220 OHM 5% 1/4W	
R320	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R321	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R322	40-27-3102	FXD C FILM 10K OHM 5% 1/4W	
R323	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S
R324	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S
R325	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S
R326	40-27-0102	FXD C FILM 10 OHM 5% 1/4W	NAS1/4S

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040		
R327	40-27-0102	FXD C FILM 10	OHM 5% 1/4W		NAS1/4S
R328	40-27-0222	FXD C FILM 22	OHM 5% 1/4W		NAS1/4S
R329	40-27-0222	FXD C FILM 22	OHM 5% 1/4W		NAS1/4S
R330	40-27-0472	FXD C FILM 47	OHM 5% 1/4W		NAS1/4S
R331	40-27-0472	FXD C FILM 47	OHM 5% 1/4W		NAS1/4S
R332	42-83-1470	FXD M FILM 470	OHM 1% 1/4W		
R333	42-83-1470	FXD M FILM 470	OHM 1% 1/4W		
R334	40-27-1682	FXD C FILM 680	OHM 5% 1/4W		
R335	40-27-1682	FXD C FILM 680	OHM 5% 1/4W		
R336	40-27-1822	FXD C FILM 820	OHM 5% 1/4W		
R337	40-27-2152	FXD C FILM 1.5K	OHM 5% 1/4W		
R338	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W		
R339	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W		
R340	40-27-1222	FXD C FILM 220	OHM 5% 1/4W		
R341	40-27-1222	FXD C FILM 220	OHM 5% 1/4W		
R342	40-27-3272	FXD C FILM 27K	OHM 5% 1/4W		
R343	40-27-0222	FXD C FILM 22	OHM 5% 1/4W		NAS1/4S
R344	40-27-0222	FXD C FILM 22	OHM 5% 1/4W		NAS1/4S
R345	44-91-3330	FXD M OXIDE 33K	OHM 5% 1W		
R346	44-91-3330	FXD M OXIDE 33K	OHM 5% 1W		
R347	40-37-3471	FXD C FILM 47K	OHM 5% 1/2W		
R348	40-37-3471	FXD C FILM 47K	OHM 5% 1/2W		
R349	40-27-2332	FXD C FILM 3.3K	OHM 5% 1/4W		
R350	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W		
R351	40-27-2332	FXD C FILM 3.3K	OHM 5% 1/4W		
R352	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W		
R353	40-27-0102	FXD C FILM 10	OHM 5% 1/4W		NAS1/4S
R354	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R355	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R356	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R357	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R358	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R359	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R360	40-27-1332	FXD C FILM 330	OHM 5% 1/4W		
R361	40-27-3122	FXD C FILM 12K	OHM 5% 1/4W		
R362	38-00-0070	THERMISTOR 200	OHM	TOSHIBA	D22A
R363	38-00-0070	THERMISTOR 200	OHM	TOSHIBA	D22A
R621	40-37-5221	FXD C FILM 2.2M	OHM 5% 1/2W		
R622	40-37-5221	FXD C FILM 2.2M	OHM 5% 1/2W		
R623	44-92-2270	FXD M OXIDE 2.7K	OHM 5% 2W		
R624	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W		
R625	40-27-0472	FXD C FILM 47	OHM 5% 1/4W		NAS1/4S
R626	40-27-1222	FXD C FILM 220	OHM 5% 1/4W		
R627	40-27-1562	FXD C FILM 560	OHM 5% 1/4W		
R628	42-83-4120	FXD M FILM 120K	OHM 1% 1/4W		
R629	42-83-3100	FXD M FILM 10K	OHM 1% 1/4W		
R630	44-92-2270	FXD M OXIDE 2.7K	OHM 5% 2W		
R631	44-91-9474	FXD M OXIDE 0.47	OHM 5% 1W	MATSUSITA	ERX1ANJ
R632	40-27-0472	FXD C FILM 47	OHM 5% 1/4W		NAS1/4S
R633	44-91-1100	FXD M OXIDE 100	OHM 5% 1W	HOKURIKU	MOR1B
R634	40-27-0682	FXD C FILM 68	OHM 5% 1/4W		NAS1/4S
R635	44-91-9474	FXD M OXIDE 0.47	OHM 5% 1W	MATSUSITA	ERX1ANJ
R636	44-91-1100	FXD M OXIDE 100	OHM 5% 1W	HOKURIKU	MOR1B
R637	40-27-2562	FXD C FILM 5.6K	OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040		
R638	42-83-3120	FXD M FILM	12K OHM 1% 1/4W		
R639	42-83-3120	FXD M FILM	12K OHM 1% 1/4W		
R640	40-27-2562	FXD C FILM	5.6K OHM 5% 1/4W		
R641	40-27-2562	FXD C FILM	5.6K OHM 5% 1/4W		
R642	42-83-2390	FXD M FILM	3.9K OHM 1% 1/4W		
R643	42-83-2910	FXD M FILM	9.1K OHM 1% 1/4W		
R644	40-27-1152	FXD C FILM	150 OHM 5% 1/4W		
R646	40-37-1101	FXD C FILM	100 OHM 5% 1/2W		
RV101	48-33-3200	VAR M GLAZE	20K OHM B	TEITSU	TM64K3(PV)
RV102	48-33-1100	VAR M GLAZE	100 OHM B	TEITSU	TM64K3(PV)
RV103	48-33-1500	VAR M GLAZE	500 OHM B	TEITSU	TM64K3(PV)
RV104	48-33-3200	VAR M GLAZE	20K OHM B	TEITSU	TM64K3(PV)
RV106	48-33-3200	VAR M GLAZE	20K OHM B	TEITSU	TM64K3(PV)
RV107	48-33-1500	VAR M GLAZE	500 OHM B	TEITSU	TM64K3(PV)
RV108	48-33-2100	VAR M GLAZE	1K OHM B	TEITSU	TM64K3(PV)
RV109	48-33-1100	VAR M GLAZE	100 OHM B	TEITSU	TM64K3(PV)
RV110	48-33-2100	VAR M GLAZE	1K OHM B	TEITSU	TM64K3(PV)
RV112	48-33-2200	VAR M GLAZE	2K OHM B	TEITSU	TM64K3(PV)
RV201	48-33-3200	VAR M GLAZE	20K OHM B	TEITSU	TM64K3(PV)
RV202	48-33-1100	VAR M GLAZE	100 OHM B	TEITSU	TM64K3(PV)
RV203	48-33-1500	VAR M GLAZE	500 OHM B	TEITSU	TM64K3(PV)
RV204	48-33-3200	VAR M GLAZE	20K OHM B	TEITSU	TM64K3(PV)
RV206	48-33-3200	VAR M GLAZE	20K OHM B	TEITSU	TM64K3(PV)
RV207	48-33-1500	VAR M GLAZE	500 OHM B	TEITSU	TM64K3(PV)
RV208	48-33-2100	VAR M GLAZE	1K OHM B	TEITSU	TM64K3(PV)
RV210	48-33-2100	VAR M GLAZE	1K OHM B	TEITSU	TM64K3(PV)
RV301	48-33-1200	VAR M GLAZE	200 OHM B	TEITSU	TM64K3(PV)
RV302	48-33-2200	VAR M GLAZE	2K OHM B	TEITSU	TM64K3(PV)
RV606	48-33-2100	VAR M GLAZE	1K OHM B	TEITSU	TM64K3(PV)
S101	80-98-0580	SW ROTARY WITH RV	VOLT/DIV	ALPS	S21P2YC
S102	82-70-8231	LEVER SWITCH		ALPS	SLR823-1
S201	80-98-0580	SW ROTARY WITH RV	VOLT/DIV	ALPS	S21P2YC
S202	82-70-8231	LEVER SWITCH		ALPS	SLR823-1
S301	82-70-8231	LEVER SWITCH		ALPS	SLR823-1
U101	34-00-0111	FET OPE-AMP		N.S	LF356N
U102	30-90-0141	TRANSISTOR ARRAYS	5 NPN	RCA	CA3086
U201	34-00-0111	FET OPE-AMP		N.S	LF356N
U202	30-90-0141	TRANSISTOR ARRAYS	5 NPN	RCA	CA3086
U301	35-70-0008	QUAD 2-INPUT NAND		HITACHI	HD74LS00P
U602	34-00-0240	DUAL OPE-AMP		NEC	UPC4558C
U603	34-00-0240	DUAL OPE-AMP		NEC	UPC4558C

A2 ASSEMBLY

C401	52-05-2468	FXD CER	0.01UF +80-20% 50V TYPE2
C402	54-40-1200	FXD ELECT	10MF 50WV
C403	50-67-0040	FXD PLSTC FILM	0.022MF 10% 100WV
C404	52-06-2184	FXD CER	47PF 10% 50V TYPE1
C405	52-06-2184	FXD CER	47PF 10% 50V TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040
C406	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C407	54-40-1200	FXD ELECT 10MF 50WV
C408	54-30-1960	FXD ELECT 47MF 25WV
C409	54-40-1200	FXD ELECT 10MF 50WV
C410	54-30-1960	FXD ELECT 47MF 25WV
C411	55-37-2050	FXD TANT ELECT 1UF 35V
C412	54-30-1970	FXD ELECT 100MF 25WV
C413	50-67-0030	FXD PLSTC FILM 0.01MF 10% 100WV
C414	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C415	54-40-1200	FXD ELECT 10MF 50WV
C416	54-40-1200	FXD ELECT 10MF 50WV
C417	52-06-2165	FXD CER 33PF 10% 500V TYPE1
C418	54-40-1200	FXD ELECT 10MF 50WV
C419	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C420	52-06-2184	FXD CER 47PF 10% 50V TYPE1
C421	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C422	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C423	54-30-1960	FXD ELECT 47MF 25WV
C424	54-40-1200	FXD ELECT 10MF 50WV
C425	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C426	50-65-0530	FXD M PLSTC FILM 1000PF 5% 100WV
C427	50-65-0540	FXD M PLSTC FILM 1UF 5% 100WV
C429	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C430	52-06-2125	FXD CER 15PF 10% 500V TYPE1
C431	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C432	54-40-1200	FXD ELECT 10MF 50WV
C450	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C451	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C454	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2
C501	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C502	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C503	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C504	54-40-1200	FXD ELECT 10MF 50WV
C505	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C506	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C651	54-40-1200	FXD ELECT 10MF 50WV
C652	54-40-1200	FXD ELECT 10MF 50WV
C653	50-67-0020	FXD PLSTC FILM 0.0047MF 10% 100WV
C654	50-67-0050	FXD PLSTC FILM 0.047MF 10% 100WV
C655	54-40-1210	FXD ELECT 22MF 50WV
C656	55-37-2050	FXD TANT ELECT 1UF 35V
C659	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1
C660	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1
C661	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1
C662	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1
C663	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1
C664	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2
C665	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1
C666	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1
C668	52-08-5145	FXD CER 22PF 10% 2KV TYPE1
C669	50-67-0040	FXD PLSTC FILM 0.022MF 10% 100WV
C681	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C682	52-06-2265	FXD CER 220PF 10% 50V TYPE1
C683	54-40-1200	FXD ELECT 10MF 50WV

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040		
C684	54-40-1200	FXD ELECT 10MF 50WV		
C685	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C687	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
C688	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C689	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C690	54-40-1200	FXD ELECT 10MF 50WV		
C691	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1		
C692	52-96-1170	FXD CER 5PF 1KV		
C693	52-96-1170	FXD CER 5PF 1KV		
C694	54-40-1200	FXD ELECT 10MF 50WV		
CR401	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR402	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR403	32-30-1740	DIODE VR=3V IO=30MA	HITACHI	1SS174
CR404	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR405	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR406	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR407	32-30-1740	DIODE VR=3V IO=30MA	HITACHI	1SS174
CR408	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR409	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR410	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR411	32-92-0033	ZENER VZ=3.2 - 3.4V	HITACHI	HZ3C-2
CR412	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR413	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR414	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR415	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR416	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR417	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR418	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR419	32-91-1805	ZENER VZ=5.48-5.76V P=0.4W	NEC	RD5.6JSB2
CR420	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR421	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR422	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR423	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR424	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR426	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR428	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR429	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR430	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR431	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR432	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR433	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR501	32-30-1740	DIODE VR=3V IO=30MA	HITACHI	1SS174
CR502	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR503	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR504	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR651	32-91-1805	ZENER VZ=5.48-5.76V P=0.4W	NEC	RD5.6JSB2
CR652	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR653	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR654	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR657	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR658	32-90-1820	DIODE VR=2KV FAST RECOVERY	HITACHI	ERB26-20
CR659	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR660	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040		
CR661	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR662	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR663	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR664	32-30-0830	DIODE VR=250V IO=200MA	HITACHI	1SS83
CR665	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR666	32-92-0022	ZENER VZ=2.1 - 2.3V	HITACHI	HZ2B-3
CR667	32-92-0022	ZENER VZ=2.1 - 2.3V	HITACHI	HZ2B-3
CR668	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR669	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR670	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR680	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
DS651	23-70-0100	LAMP NEON		
DS652	23-70-0100	LAMP NEON		
L400	67-10-1480	INDUCTOR 4.7UH 10%		LAL04NA
L401	67-10-0890	INDUCTOR 100MH 10%		
L402	67-10-0921	INDUCTOR 470UH 10%		LAL04NA
L650	67-10-0890	INDUCTOR 100MH 10%		
Q401	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q402	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q403	31-20-1073	FET IDSS=4.5-7.7MA	SONY	2SK107-3
Q404	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q405	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q406	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q407	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q408	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q409	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q410	31-20-1171	FET	TOSHIBA	2SK117-BL
Q411	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q412	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q413	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q414	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q415	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q416	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q417	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q418	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q419	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q420	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q421	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q422	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q423	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q424	30-10-8381	TR SI PNP	MATSUSITA	2SA838-B
Q425	31-20-1171	FET	TOSHIBA	2SK117-BL
Q426	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q427	31-20-1171	FET	TOSHIBA	2SK117-BL
Q428	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q429	30-31-8431	TR SI NPN	NEC	2SC1843-E
Q430	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q431	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q432	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q433	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q434	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
Q435	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q436	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q437	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q501	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q502	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q503	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q504	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q505	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q506	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q507	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q508	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q509	30-20-6481	TR SI PNP	HITACHI	2SB648A
Q510	30-40-6681	TR SI NPN	HITACHI	2SD668A-C
Q511	30-40-6681	TR SI NPN	HITACHI	2SD668A-C
Q512	30-20-6481	TR SI PNP	HITACHI	2SB648A
Q651	30-40-8804	TR SI NPN (60V 3A 30W)	TOSHIBA	2SD880-O
Q652	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q654	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q655	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q656	30-32-7041	TR SI NPN	TOSHIBA	2SC2704-O
Q657	30-32-7041	TR SI NPN	TOSHIBA	2SC2704-O
Q658	30-32-7041	TR SI NPN	TOSHIBA	2SC2704-O
Q659	30-32-7041	TR SI NPN	TOSHIBA	2SC2704-O
Q660	31-20-1171	FET	TOSHIBA	2SK117-BL
R401	40-27-0472	FXD C FILM 47 OHM 5% 1/4W		NAS1/4S
R402	42-83-2100	FXD M FILM 1K OHM 1% 1/4W		
R403	40-27-2122	FXD C FILM 1.2K OHM 5% 1/4W		
R404	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R405	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W		
R406	40-27-0472	FXD C FILM 47 OHM 5% 1/4W		NAS1/4S
R407	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R408	40-27-3472	FXD C FILM 47K OHM 5% 1/4W		
R409	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R410	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R411	42-33-0420	FXD M FILM 1M OHM 1% 1/2W		RN1/2S
R412	40-27-0332	FXD C FILM 33 OHM 5% 1/4W		NAS1/4S
R413	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W		
R414	40-27-1562	FXD C FILM 560 OHM 5% 1/4W		
R415	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W		
R416	40-27-0682	FXD C FILM 68 OHM 5% 1/4W		NAS1/4S
R417	40-27-2392	FXD C FILM 3.9K OHM 5% 1/4W		
R418	40-27-1562	FXD C FILM 560 OHM 5% 1/4W		
R419	40-27-1562	FXD C FILM 560 OHM 5% 1/4W		
R420	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R421	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R422	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R423	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R424	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W		
R425	40-27-4102	FXD C FILM 100K OHM 5% 1/4W		
R426	40-27-4102	FXD C FILM 100K OHM 5% 1/4W		
R427	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R428	40-27-3222	FXD C FILM 22K OHM 5% 1/4W		
R429	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
R430	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W	
R431	40-27-4472	FXD C FILM 470K	OHM 5% 1/4W	
R432	40-27-4472	FXD C FILM 470K	OHM 5% 1/4W	
R433	40-27-1222	FXD C FILM 220	OHM 5% 1/4W	
R434	40-27-8472	FXD C FILM 4.7	OHM 5% 1/4W	
R435	40-27-0822	FXD C FILM 82	OHM 5% 1/4W	NAS1/4S
R436	40-27-1272	FXD C FILM 270	OHM 5% 1/4W	
R437	40-27-1182	FXD C FILM 180	OHM 5% 1/4W	
R438	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W	
R439	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W	
R440	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R441	40-27-0102	FXD C FILM 10	OHM 5% 1/4W	NAS1/4S
R442	40-27-0102	FXD C FILM 10	OHM 5% 1/4W	NAS1/4S
R443	40-27-1682	FXD C FILM 680	OHM 5% 1/4W	
R444	40-27-1332	FXD C FILM 330	OHM 5% 1/4W	
R445	40-27-3122	FXD C FILM 12K	OHM 5% 1/4W	
R446	40-27-2562	FXD C FILM 5.6K	OHM 5% 1/4W	
R447	40-27-1562	FXD C FILM 560	OHM 5% 1/4W	
R448	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R449	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W	
R450	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W	
R451	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W	
R452	40-27-3472	FXD C FILM 47K	OHM 5% 1/4W	
R453	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R454	42-83-3200	FXD M FILM 20K	OHM 1% 1/4W	
R455	42-83-3330	FXD M FILM 33K	OHM 1% 1/4W	
R456	40-27-2682	FXD C FILM 6.8K	OHM 5% 1/4W	
R457	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R458	40-27-2102	FXD C FILM 1K	OHM 5% 1/4W	
R459	40-27-0472	FXD C FILM 47	OHM 5% 1/4W	NAS1/4S
R460	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W	
R461	40-27-1822	FXD C FILM 820	OHM 5% 1/4W	
R462	40-27-3562	FXD C FILM 56K	OHM 5% 1/4W	
R463	40-27-2272	FXD C FILM 2.7K	OHM 5% 1/4W	
R464	40-27-2122	FXD C FILM 1.2K	OHM 5% 1/4W	
R465	40-27-2392	FXD C FILM 3.9K	OHM 5% 1/4W	
R466	40-27-3182	FXD C FILM 18K	OHM 5% 1/4W	
R467	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R468	40-27-4472	FXD C FILM 470K	OHM 5% 1/4W	
R469	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W	
R470	40-27-4102	FXD C FILM 100K	OHM 5% 1/4W	
R471	40-27-3332	FXD C FILM 33K	OHM 5% 1/4W	
R472	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R473	40-27-2472	FXD C FILM 4.7K	OHM 5% 1/4W	
R474	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R475	42-83-2160	FXD M FILM 1.6K	OHM 1% 1/4W	
R476	40-27-2222	FXD C FILM 2.2K	OHM 5% 1/4W	
R477	42-83-2390	FXD M FILM 3.9K	OHM 1% 1/4W	
R478	42-83-1470	FXD M FILM 470	OHM 1% 1/4W	
R479	40-27-2332	FXD C FILM 3.3K	OHM 5% 1/4W	
R480	42-24-0231	FXD M GLAZE 5M	OHM 1% 0.31W	RG08V2F
R481	40-27-2332	FXD C FILM 3.3K	OHM 5% 1/4W	
R482	40-27-3102	FXD C FILM 10K	OHM 5% 1/4W	
R483	40-27-2332	FXD C FILM 3.3K	OHM 5% 1/4W	

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040				
R484	44-25-0001	FXD M GLAZE R-NET				KIKUSUI	TNB13T0006
R485	44-07-0190	FXD M GLAZE R-NET	10K	OHM X10			
R486	42-83-2160	FXD M FILM	1.6K	OHM 1%	1/4W		
R487	40-27-1682	FXD C FILM	680	OHM 5%	1/4W		
R488	40-27-1222	FXD C FILM	220	OHM 5%	1/4W		
R489	40-27-0682	FXD C FILM	68	OHM 5%	1/4W		NAS1/4S
R490	40-27-1472	FXD C FILM	470	OHM 5%	1/4W		
R492	40-27-1102	FXD C FILM	100	OHM 5%	1/4W		NAS1/4S
R494	40-27-3102	FXD C FILM	10K	OHM 5%	1/4W		
R495	40-27-3102	FXD C FILM	10K	OHM 5%	1/4W		
R496	40-27-3102	FXD C FILM	10K	OHM 5%	1/4W		
R497	40-27-2152	FXD C FILM	1.5K	OHM 5%	1/4W		
R498	40-27-2332	FXD C FILM	3.3K	OHM 5%	1/4W		
R499	40-27-3102	FXD C FILM	10K	OHM 5%	1/4W		
R500	40-27-3102	FXD C FILM	10K	OHM 5%	1/4W		
R501	40-27-2682	FXD C FILM	6.8K	OHM 5%	1/4W		
R502	40-27-1472	FXD C FILM	470	OHM 5%	1/4W		
R503	42-83-0560	FXD M FILM	56	OHM 1%	1/4W		
R504	40-27-2562	FXD C FILM	5.6K	OHM 5%	1/4W		
R505	40-27-2562	FXD C FILM	5.6K	OHM 5%	1/4W		
R506	40-27-2562	FXD C FILM	5.6K	OHM 5%	1/4W		
R507	40-27-2562	FXD C FILM	5.6K	OHM 5%	1/4W		
R508	42-83-2100	FXD M FILM	1K	OHM 1%	1/4W		
R509	42-83-2100	FXD M FILM	1K	OHM 1%	1/4W		
R510	42-83-2100	FXD M FILM	1K	OHM 1%	1/4W		
R511	42-83-1560	FXD M FILM	560	OHM 1%	1/4W		
R512	40-27-1332	FXD C FILM	330	OHM 5%	1/4W		
R513	40-27-3102	FXD C FILM	10K	OHM 5%	1/4W		
R514	40-27-1332	FXD C FILM	330	OHM 5%	1/4W		
R515	42-83-4100	FXD M FILM	100K	OHM 1%	1/4W		
R516	40-27-4102	FXD C FILM	100K	OHM 5%	1/4W		
R517	42-83-4100	FXD M FILM	100K	OHM 1%	1/4W		
R518	40-27-2222	FXD C FILM	2.2K	OHM 5%	1/4W		
R519	40-27-2222	FXD C FILM	2.2K	OHM 5%	1/4W		
R520	40-27-2152	FXD C FILM	1.5K	OHM 5%	1/4W		
R521	40-27-1332	FXD C FILM	330	OHM 5%	1/4W		
R522	40-27-0472	FXD C FILM	47	OHM 5%	1/4W		NAS1/4S
R523	40-27-2152	FXD C FILM	1.5K	OHM 5%	1/4W		
R524	40-27-1332	FXD C FILM	330	OHM 5%	1/4W		
R525	40-27-0472	FXD C FILM	47	OHM 5%	1/4W		NAS1/4S
R530	40-27-4102	FXD C FILM	100K	OHM 5%	1/4W		
R531	40-27-4102	FXD C FILM	100K	OHM 5%	1/4W		
R532	40-27-1102	FXD C FILM	100	OHM 5%	1/4W		NAS1/4S
R651	42-83-4120	FXD M FILM	120K	OHM 1%	1/4W		
R652	42-83-3120	FXD M FILM	12K	OHM 1%	1/4W		
R653	42-83-2820	FXD M FILM	8.2K	OHM 1%	1/4W		
R654	42-83-4100	FXD M FILM	100K	OHM 1%	1/4W		
R655	40-27-2102	FXD C FILM	1K	OHM 5%	1/4W		
R656	40-27-0472	FXD C FILM	47	OHM 5%	1/4W		NAS1/4S
R657	44-91-8101	FXD M OXIDE	1	OHM 5%	1W	MATSUSITA	ERX1ANJ
R658	40-27-2562	FXD C FILM	5.6K	OHM 5%	1/4W		
R659	40-27-1472	FXD C FILM	470	OHM 5%	1/4W		
R661	42-34-2190	FXD M GLAZE	6.8M	OHM 1%	0.8W		
R662	42-44-0330	FXD T FILM	10M	OHM 1%	1W		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040		
R663	40-27-4472	FXD C FILM 470K OHM 5% 1/4W			
R664	40-27-3102	FXD C FILM 10K OHM 5% 1/4W			
R665	40-37-5221	FXD C FILM 2.2M OHM 5% 1/2W			
R666	40-37-6101	FXD C FILM 10M OHM 5% 1/2W			
R667	40-37-6101	FXD C FILM 10M OHM 5% 1/2W			
R668	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W			
R670	40-27-3272	FXD C FILM 27K OHM 5% 1/4W			
R671	40-27-4102	FXD C FILM 100K OHM 5% 1/4W			
R673	40-27-3102	FXD C FILM 10K OHM 5% 1/4W			
R674	40-37-6101	FXD C FILM 10M OHM 5% 1/2W			
R675	40-37-6101	FXD C FILM 10M OHM 5% 1/2W			
R677	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W			
R678	40-27-1102	FXD C FILM 100 OHM 5% 1/4W			NAS1/4S
R679	40-27-1102	FXD C FILM 100 OHM 5% 1/4W			NAS1/4S
R680	40-27-4472	FXD C FILM 470K OHM 5% 1/4W			
R681	40-27-2182	FXD C FILM 1.8K OHM 5% 1/4W			
R682	40-27-3222	FXD C FILM 22K OHM 5% 1/4W			
R683	40-27-2332	FXD C FILM 3.3K OHM 5% 1/4W			
R684	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W			
R685	40-27-1122	FXD C FILM 120 OHM 5% 1/4W			
R686	40-27-1222	FXD C FILM 220 OHM 5% 1/4W			
R687	40-27-2562	FXD C FILM 5.6K OHM 5% 1/4W			
R688	40-27-1332	FXD C FILM 330 OHM 5% 1/4W			
R689	40-27-2472	FXD C FILM 4.7K OHM 5% 1/4W			
R690	40-37-3471	FXD C FILM 47K OHM 5% 1/2W			
R691	40-37-3471	FXD C FILM 47K OHM 5% 1/2W			
R692	40-37-3471	FXD C FILM 47K OHM 5% 1/2W			
R693	40-27-1682	FXD C FILM 680 OHM 5% 1/4W			
R694	40-27-1682	FXD C FILM 680 OHM 5% 1/4W			
R695	40-37-3471	FXD C FILM 47K OHM 5% 1/2W			
R697	40-27-1152	FXD C FILM 150 OHM 5% 1/4W			
R698	40-27-3392	FXD C FILM 39K OHM 5% 1/4W			
R699	40-27-4102	FXD C FILM 100K OHM 5% 1/4W			
R1420	40-27-3102	FXD C FILM 10K OHM 5% 1/4W			
R1652	40-27-3182	FXD C FILM 18K OHM 5% 1/4W			
R1654	40-27-2152	FXD C FILM 1.5K OHM 5% 1/4W			
R1655	40-27-2222	FXD C FILM 2.2K OHM 5% 1/4W			
R1656	40-27-0822	FXD C FILM 82 OHM 5% 1/4W			NAS1/4S
RV401	48-33-2500	VAR M GLAZE 5K OHM B		TEITSU	TM64K3(PV)
RV402	48-33-4500	VAR M GLAZE 500K OHM B		TEITSU	TM64K3(PV)
RV403	48-33-3100	VAR M GLAZE 10K OHM B		TEITSU	TM64K3(PV)
RV651	48-26-5220	VAR M GLAZE 2.2M OHM			
RV652	48-33-4100	VAR M GLAZE 100K OHM B		TEITSU	TM64K3(PV)
RV653	48-33-3200	VAR M GLAZE 20K OHM B		TEITSU	TM64K3(PV)
S401	82-70-5231	LEVER SWICH			
S402	82-70-5242	LEVER SWITCH		ALPS	SLR524-2
S403	82-70-5222	PUSH SWITCH		ALPS	SLR522-2
S404	80-98-0840	ROTARY SWITCH (SWEEP 3)		ALPS	
U401	35-70-0003	QUAD 2-INPUT POSI-NAND		FAIRCHILD	74F00PC
U402	35-70-1123	DUAL J-K F-F WITH P/C		HITACHI	HD74LS112P
U403	34-00-0215	J-FET INPUT OPE-AMP		TEXAS INS.	TL081CP

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
U404	34-69-0030	TRIPLE 2-CHANNEL MULTIPLEXER	TOSHIBA	TC4053BP
U405	34-69-0080	TRIPLE 8-CHANNEL MULTIPLEXER	TOSHIBA	TC4051BP
U406	35-70-1481	OCTAL PRIORITY ENCODERS	HITACHI	HD74LS148P
U407	35-19-2080	TR-ARRAY	TOSHIBA	TD62504P
U408	35-19-2080	TR-ARRAY	TOSHIBA	TD62504P
U409	35-70-0008	QUAD 2-INPUT NAND	HITACHI	HD74LS00P
U651	34-00-0215	J-FET INPUT OPE-AMP	TEXAS INS.	TL081CP
A3 ASSEMBLY				
C452	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		
C453	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		
C460	54-20-1150	FXD ELECT 3900MF 16WV		
C461	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2		
C463	54-20-1170	FXD ELECT 1000MF 16WV		KME16VB
C464	52-06-2245	FXD CER 150PF 10% 50V TYPE1		
C465	54-30-1970	FXD ELECT 100MF 25WV		
C466	52-06-2265	FXD CER 220PF 10% 50V TYPE1		
CR427	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR450	32-90-2110	DIODE BRIGE VRM=400V IO=1A	TOSHIBA	1G4B42
CR451	32-90-2420	DIODE BRIGE VRM=40V IO=8A	N.INTER	C8P04Q
CR452	32-91-1805	ZENER VZ=5.48-5.76V P=0.4W	NEC	RD5.6JSB2
L410	67-10-1490	INDUCTOR 125UH		FN-8D-50
L411	67-10-1490	INDUCTOR 125UH		FN-8D-50
Q440	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q441	30-10-4731	TR SI PNP	TOSHIBA	2SA473-Y
R1401	40-16-2821	FXD C FILM 8.2K OHM 5% 1/6W		RD1/6FS
R1402	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1403	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1404	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1405	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1406	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1407	44-07-0190	FXD M GLAZE R-NET 10K OHM X10		
R1408	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R1409	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R1410	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1411	43-58-0390	FXD WW 0.15 OHM 10% 2W		RGC2T
R1412	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R1413	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R1414	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R1415	42-80-2391	FXD M FILM 3.9K OHM 1% 1/6W		RN1/6FS
R1416	42-80-2121	FXD M FILM 1.2K OHM 1% 1/6W		RN1/6FS
RV406	45-01-0550	VAR C COMP 10K/100K OHM B		
S405	81-03-0270	PUSH SWITCH	ALPS	SUE30
S406	81-05-0250	PUSH SWITCH	KIKUSUI	S8504661
S408	80-98-0810	SWITCH	ALPS	

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040		
U410	34-40-0400	REGULATOR (SWITCHING)	TEXAS INS.	TL497AC
A4 ASSEMBLY				
C1605	50-45-0500	FXD PLSTC FILM 0.01MF 5% 50WV		
C1606	50-45-0500	FXD PLSTC FILM 0.01MF 5% 50WV		
C1607	52-06-2051	FXD CER 5P 10% 50V TYPE1		
C1608	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		
C1609	54-30-1960	FXD ELECT 47MF 25WV		
C1610	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2		
CR1601	32-91-2300	ZENER VZ=135 - 165V P=1W	TOSHIBA	1Z150
CR1605	37-00-0061	LAMP LED GREEN	TOSHIBA	TLG145
DS1601	23-44-0000	LAMP FILAMENT 14V 80MA		
DS1602	23-44-0000	LAMP FILAMENT 14V 80MA		
Q1601	30-31-8461	TR SI NPN	MATSUSITA	2SC1846-R
Q1602	30-31-8461	TR SI NPN	MATSUSITA	2SC1846-R
R1601	40-27-4102	FXD C FILM 100K OHM 5% 1/4W		
R1602	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R1603	40-27-3102	FXD C FILM 10K OHM 5% 1/4W		
R1604	40-27-4102	FXD C FILM 100K OHM 5% 1/4W		
R1605	40-27-4102	FXD C FILM 100K OHM 5% 1/4W		
R1606	40-27-4222	FXD C FILM 220K OHM 5% 1/4W		
R1607	40-27-4472	FXD C FILM 470K OHM 5% 1/4W		
R1608	40-27-4472	FXD C FILM 470K OHM 5% 1/4W		
R1609	40-27-1472	FXD C FILM 470 OHM 5% 1/4W		
R1610	42-83-3120	FXD M FILM 12K OHM 1% 1/4W		
R1611	40-27-3682	FXD C FILM 68K OHM 5% 1/4W		
R1612	42-83-1470	FXD M FILM 470 OHM 1% 1/4W		
R1613	40-27-0102	FXD C FILM 10 OHM 5% 1/4W		NAS1/4S
R1614	40-27-1682	FXD C FILM 680 OHM 5% 1/4W		
R1615	40-27-1102	FXD C FILM 100 OHM 5% 1/4W		NAS1/4S
R1616	40-27-1562	FXD C FILM 560 OHM 5% 1/4W		
RV1601	45-44-3101	VAR C COMP 10K OHM B	KIKUSUI	V16L6SN15K
RV1603	45-44-4201	VAR C COMP 200K OHM B	KIKUSUI	V16L6SN15K
RV1604	45-43-2200	VAR M GLAZE 2K OHM		
RV1605	45-44-3101	VAR C COMP 10K OHM B	KIKUSUI	V16L6SN15K
S1601	81-01-0270	PUSH SWITCH	ALPS	SDG5P-E
U1601	35-60-0000	QUAD 2-INPUT NAND GATES	TOSHIBA	TC4011BP
A5 ASSEMBLY				
C800	52-06-2274	FXD CER 270P 10% 50V TYPE1		
C801	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
C802	54-40-1210	FXD ELECT 22MF 50WV		
C803	52-06-2215	FXD CER 82PF 10% 500V TYPE1		
C804	54-40-1200	FXD ELECT 10MF 50WV		
C805	54-40-1200	FXD ELECT 10MF 50WV		
C806	52-06-2225	FXD CER 100PF 10% 50V TYPE1		
C807	50-67-0000	FXD PLSTC FILM 0.001MF 10% 100WV		
C808	50-67-0020	FXD PLSTC FILM 0.0047MF 10% 100WV		
C809	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		
C811	50-65-0530	FXD M PLSTC FILM 1000PF 5% 100WV		
C812	50-65-0530	FXD M PLSTC FILM 1000PF 5% 100WV		
C813	54-40-1200	FXD ELECT 10MF 50WV		
C814	52-06-2265	FXD CER 220PF 10% 50V TYPE1		
C815	54-30-1970	FXD ELECT 100MF 25WV		
C816	50-67-0050	FXD PLSTC FILM 0.047MF 10% 100WV		
C817	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C818	54-40-1200	FXD ELECT 10MF 50WV		
C819	54-40-1200	FXD ELECT 10MF 50WV		
C820	54-40-1200	FXD ELECT 10MF 50WV		
C821	54-40-1200	FXD ELECT 10MF 50WV		
C822	55-37-2050	FXD TANT ELECT 1UF 35V		
C823	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C824	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C825	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C826	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C827	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C828	54-30-1960	FXD ELECT 47MF 25WV		
C829	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C830	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C831	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C832	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C833	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C834	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C835	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C836	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C837	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C838	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C839	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C840	54-30-1960	FXD ELECT 47MF 25WV		
C841	54-30-1960	FXD ELECT 47MF 25WV		
C850	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
CR800	32-30-1740	DIODE VR=3V IO=30MA	HITACHI	1SS174
CR801	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR802	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR803	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR804	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR805	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR806	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR807	32-92-0022	ZENER VZ=2.1 - 2.3V	HITACHI	HZ2B-3
CR808	32-92-0022	ZENER VZ=2.1 - 2.3V	HITACHI	HZ2B-3
Q800	30-10-8441	TR SI PNP	HITACHI	2SA844-D
Q801	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q802	30-30-9451	TR SI NPN	NEC	2SC945-Q

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
Q803	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q804	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q805	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q810	30-30-9451	TR SI NPN	NEC	2SC945-Q
R800	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R801	44-07-0020	FXD M GLAZE R-NET 10K OHM X4		
R802	40-16-2121	FXD C FILM 1.2K OHM 5% 1/6W		RD1/6FS
R803	40-16-3471	FXD C FILM 47K OHM 5% 1/6W		RD1/6FS
R804	40-16-4101	FXD C FILM 100K OHM 5% 1/6W		RD1/6FS
R805	40-16-2561	FXD C FILM 5.6K OHM 5% 1/6W		RD1/6FS
R806	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R807	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R808	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R809	40-16-0471	FXD C FILM 47 OHM 5% 1/6W		RD1/6FS
R810	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R811	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R812	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R813	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R814	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R815	40-16-3121	FXD C FILM 12K OHM 5% 1/6W		RD1/6FS
R816	40-16-2821	FXD C FILM 8.2K OHM 5% 1/6W		RD1/6FS
R817	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R818	40-16-3121	FXD C FILM 12K OHM 5% 1/6W		RD1/6FS
R819	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
R820	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R821	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R822	40-16-4121	FXD C FILM 120K OHM 5% 1/6W		RD1/6FS
R823	40-16-1101	FXD C FILM 100 OHM 5% 1/6W		RD1/6FS
R824	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R825	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R826	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R827	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R828	40-16-1101	FXD C FILM 100 OHM 5% 1/6W		RD1/6FS
R829	40-16-1101	FXD C FILM 100 OHM 5% 1/6W		RD1/6FS
R830	40-16-2331	FXD C FILM 3.3K OHM 5% 1/6W		RD1/6FS
R831	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
R832	40-16-3471	FXD C FILM 47K OHM 5% 1/6W		RD1/6FS
R833	42-80-4101	FXD M FILM 100K OHM 1% 1/6W		RN1/6FS
R834	42-80-2271	FXD M FILM 2.7K OHM 1% 1/6W		RN1/6FS
R835	42-80-3101	FXD M FILM 10K OHM 1% 1/6W		RN1/6FS
R836	42-80-2331	FXD M FILM 3.3K OHM 1% 1/6W		RN1/6FS
R837	40-16-3181	FXD C FILM 18K OHM 5% 1/6W		RD1/6FS
R838	40-16-3221	FXD C FILM 22K OHM 5% 1/6W		RD1/6FS
R839	40-16-2151	FXD C FILM 1.5K OHM 5% 1/6W		RD1/6FS
R840	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R850	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
RV800	48-33-3200	VAR M GLAZE 20K OHM B	TEITSU	TM64K3(PV)
RV801	48-33-3200	VAR M GLAZE 20K OHM B	TEITSU	TM64K3(PV)
RV802	48-33-2500	VAR M GLAZE 5K OHM B	TEITSU	TM64K3(PV)
RV803	48-33-2500	VAR M GLAZE 5K OHM B	TEITSU	TM64K3(PV)
RV804	48-33-1100	VAR M GLAZE 100 OHM B	TEITSU	TM64K3(PV)
RV805	48-33-1200	VAR M GLAZE 200 OHM B	TEITSU	TM64K3(PV)

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
U802	34-69-0030	TRIPLE 2-CHANNEL MULTIPLEXER	TOSHIBA	TC4053BP
U803	35-70-1611	SYNCHRONOUS 4BIT COUNTER	HITACHI	HD74LS161P
U804	35-70-1611	SYNCHRONOUS 4BIT COUNTER	HITACHI	HD74LS161P
U805	35-70-1611	SYNCHRONOUS 4BIT COUNTER	HITACHI	HD74LS161P
U806	35-56-0230	EPROM 16K X 8BIT 250NS	HITACHI	HN4827128G
U807	36-90-0110	Z80A-CPU 4MHZ	SHARP	LH0080A
U812	34-00-0340	FET INPUT DUAL OP AMP	TEXAS INS.	TL082CP
U813	35-70-1573	QUAD 2-TO-1 DATA SELECTORS	HITACHI	HDLS157P
U814	35-70-1573	QUAD 2-TO-1 DATA SELECTORS	HITACHI	HDLS157P
U815	35-70-1573	QUAD 2-TO-1 DATA SELECTORS	HITACHI	HDLS157P
U820	34-20-0110	SYSTEM RESETTING IC	MISTUMI	PST518A
U821	34-00-0340	FET INPUT DUAL OP AMP	TEXAS INS.	TL082CP
U822	36-20-0080	D/A CONVERTER 8BIT	HITACHI	HA17408P
U823	35-56-0110	S-RAM 2K X 8BIT 120NS	HITACHI	HM6116/P-2
U825	35-70-2451	OCTAL BUS TRANSCEIVER	HITACHI	HD74LS245P
U826	35-56-0220	EPROM 8K X 8BIT 200NS	NEC	UPD4364C
U828	36-90-0130	Z80-DMA 4MHZ	SHARP	LH0083A
U831	34-00-0340	FET INPUT DUAL OP AMP	TEXAS INS.	TL082CP
U832	35-70-1123	DUAL J-K F-F WITH P/C	HITACHI	HD74LS112P
U833	35-70-0321	QUAD 2-INPUT POSI-OR	TEXAS INS.	SN74LS32N
U834	35-70-1381	3LINE TO 8LINE DECORDER	HITACHI	HD74LS138P
U835	35-70-1531	DUAL 4-TO-1 DATA SELECTORS	TEXAS INS.	SN74LS153N
U836	35-70-3747	OCTAL D-TYPE F/F	HITACHI	HD74LS374P
U837	35-70-5411	OCTAL BUFFER	TEXAS INS.	SN74LS541N
U838	36-90-0120	Z80A-CTC 4MHZ	SHARP	LH0082
U841	35-70-0008	QUAD 2-INPUT NAND	HITACHI	HD74LS00P
U842	35-70-0321	QUAD 2-INPUT POSI-OR	TEXAS INS.	SN74LS32N
U843	35-70-0083	QUAD 2-INPUT POSI-AND	HITACHI	HDLS08P
U844	35-70-1381	3LINE TO 8LINE DECORDER	HITACHI	HD74LS138P
U845	35-70-0083	QUAD 2-INPUT POSI-AND	HITACHI	HDLS08P
U846	35-70-0008	QUAD 2-INPUT NAND	HITACHI	HD74LS00P
U847	35-70-5411	OCTAL BUFFER	TEXAS INS.	SN74LS541N
U851	35-70-1123	DUAL J-K F-F WITH P/C	HITACHI	HD74LS112P
U852	35-70-1232	DUAL RETRIGGER MONO-MULTI	HITACHI	HD74LS123P
U853	35-70-1123	DUAL J-K F-F WITH P/C	HITACHI	HD74LS112P
U854	35-70-0087	QUAD 2-INPUT POSI-AND		MM74HC08N
U855	35-70-0008	QUAD 2-INPUT NAND	HITACHI	HD74LS00P
U856	35-70-0321	QUAD 2-INPUT POSI-OR	TEXAS INS.	SN74LS32N
U857	35-70-0743	DUAL D F-F EDGE TRIGGER	HITACHI	HD74LS74P
U858	36-90-0120	Z80A-CTC 4MHZ	SHARP	LH0082

A6 ASSEMBLY

C901	52-06-2145	FXD CER	22PF	10%	500V	TYPE1
C902	52-06-2145	FXD CER	22PF	10%	500V	TYPE1
C903	52-06-2165	FXD CER	33PF	10%	500V	TYPE1
C904	52-06-2225	FXD CER	100PF	10%	50V	TYPE1
C905	52-06-2225	FXD CER	100PF	10%	50V	TYPE1
C906	52-06-2225	FXD CER	100PF	10%	50V	TYPE1
C907	52-05-2468	FXD CER	0.01UF	+80-20%	50V	TYPE2
C909	52-05-2468	FXD CER	0.01UF	+80-20%	50V	TYPE2
C910	52-06-2184	FXD CER	47PF	10%	50V	TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040
C911	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C912	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C913	52-06-2184	FXD CER 47PF 10% 50V TYPE1
C914	52-06-2204	FXD CER 68P 10% 50V TYPE1
C915	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C916	52-06-2102	FXD CER 10P 10% 50V TYPE1
C919	54-40-1200	FXD ELECT 10MF 50WV
C920	54-40-1200	FXD ELECT 10MF 50WV
C921	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C922	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C923	54-40-1200	FXD ELECT 10MF 50WV
C924	54-40-1200	FXD ELECT 10MF 50WV
C925	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C926	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C927	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C928	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C929	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C930	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C931	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C932	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C933	52-06-2145	FXD CER 22PF 10% 500V TYPE1
C934	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C935	52-06-2245	FXD CER 150PF 10% 50V TYPE1
C936	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C937	50-67-0000	FXD PLSTC FILM 0.001MF 10% 100WV
C938	52-06-2165	FXD CER 33PF 10% 500V TYPE1
C939	52-06-2184	FXD CER 47PF 10% 50V TYPE1
C940	52-06-2204	FXD CER 68P 10% 50V TYPE1
C941	52-06-2204	FXD CER 68P 10% 50V TYPE1
C942	52-06-2204	FXD CER 68P 10% 50V TYPE1
C943	52-06-2204	FXD CER 68P 10% 50V TYPE1
C944	52-06-2165	FXD CER 33PF 10% 500V TYPE1
C945	52-06-2184	FXD CER 47PF 10% 50V TYPE1
C946	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C947	52-01-3345	FXD CER 1000PF 10% 500V TYPE2
C948	52-06-2225	FXD CER 100PF 10% 50V TYPE1
C949	55-37-2050	FXD TANT ELECT 1UF 35V
C950	55-37-2050	FXD TANT ELECT 1UF 35V
C951	55-37-2050	FXD TANT ELECT 1UF 35V
C953	55-37-2050	FXD TANT ELECT 1UF 35V
C954	55-37-2050	FXD TANT ELECT 1UF 35V
C956	55-37-2050	FXD TANT ELECT 1UF 35V
C957	55-37-2050	FXD TANT ELECT 1UF 35V
C958	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2
C959	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C960	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C961	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C962	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C963	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C964	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C965	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C966	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C967	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1
C968	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION DSS 5040		
C969	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C970	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C971	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C972	54-40-1200	FXD ELECT 10MF 50WV		
C973	54-40-1200	FXD ELECT 10MF 50WV		
C974	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C975	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C976	52-05-1498	FXD CER 0.1UF +80-20% 25V TYPE2		
C977	54-40-1200	FXD ELECT 10MF 50WV		
C978	54-40-1200	FXD ELECT 10MF 50WV		
C979	52-05-2468	FXD CER 0.01UF +80-20% 50V TYPE2		
C980	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C981	54-40-1200	FXD ELECT 10MF 50WV		
C982	54-40-1200	FXD ELECT 10MF 50WV		
C983	54-40-1200	FXD ELECT 10MF 50WV		
C984	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C985	52-37-1000	FXD CER 0.047UF 20% 25V TYPE1		
C986	54-40-1200	FXD ELECT 10MF 50WV		
C987	52-01-3345	FXD CER 1000PF 10% 500V TYPE2		
C988	52-06-2215	FXD CER 82PF 10% 500V TYPE1		
CR900	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR901	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR902	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR903	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR904	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR905	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR906	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR907	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR908	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR909	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR910	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR911	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR912	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR913	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR914	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR915	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR916	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR917	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR918	32-30-1740	DIODE VR=3V IO=30MA	HITACHI	1SS174
CR919	32-30-1740	DIODE VR=3V IO=30MA	HITACHI	1SS174
CR920	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR921	32-91-1805	ZENER VZ=5.48-5.76V P=0.4W	NEC	RD5.6JSB2
CR922	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
CR923	32-30-1200	DIODE VR=60V IO=1A	HITACHI	1SS120
L900	67-10-1470	INDUCTOR 10UH 10%		LAL02KN
L901	67-10-1460	INDUCTOR 2.2UH 20%		LAL02KN
L902	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
L903	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
L904	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
L905	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
L906	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
L907	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
L908	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
L909	67-10-1450	INDUCTOR 1.0UH 20%		LAL02KN
Q900	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q901	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q902	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q903	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q904	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q905	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q906	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q907	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q908	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q909	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q910	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q911	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q912	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q913	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q914	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q915	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q916	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q917	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q918	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q919	30-32-1201	TR SI NPN	TOSHIBA	2SC2120-Y
Q920	30-31-8431	TR SI NPN	NEC	2SC1843-E
Q921	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q922	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q923	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q924	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q925	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q926	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
Q927	30-30-9451	TR SI NPN	NEC	2SC945-Q
Q928	30-31-9071	TR SI NPN	HITACHI	2SC1907
Q929	30-11-0151	TR SI PNP	TOSHIBA	2SA1015-Y
R900	42-80-3101	FXD M FILM 10K OHM 1% 1/6W		RN1/6FS
R901	42-80-0911	FXD M FILM 91 OHM 1% 1/6W		RN1/6FS
R902	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
R903	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
R904	42-80-0911	FXD M FILM 91 OHM 1% 1/6W		RN1/6FS
R905	40-16-1221	FXD C FILM 220 OHM 5% 1/6W		RD1/6FS
R906	40-16-1221	FXD C FILM 220 OHM 5% 1/6W		RD1/6FS
R907	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R908	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R909	40-16-2181	FXD C FILM 1.8K OHM 5% 1/6W		RD1/6FS
R910	40-16-1101	FXD C FILM 100 OHM 5% 1/6W		RD1/6FS
R911	40-16-2181	FXD C FILM 1.8K OHM 5% 1/6W		RD1/6FS
R912	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R913	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R914	40-16-2181	FXD C FILM 1.8K OHM 5% 1/6W		RD1/6FS
R915	40-16-2181	FXD C FILM 1.8K OHM 5% 1/6W		RD1/6FS
R916	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W		RD1/6FS
R917	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W		RD1/6FS
R918	40-16-2331	FXD C FILM 3.3K OHM 5% 1/6W		RD1/6FS
R919	40-16-1821	FXD C FILM 820 OHM 5% 1/6W		RD1/6FS

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040
R920	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W	RD1/6FS
R921	40-16-3121	FXD C FILM 12K OHM 5% 1/6W	RD1/6FS
R922	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R923	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R924	40-16-1561	FXD C FILM 560 OHM 5% 1/6W	RD1/6FS
R925	40-16-1561	FXD C FILM 560 OHM 5% 1/6W	RD1/6FS
R926	40-16-1471	FXD C FILM 470 OHM 5% 1/6W	RD1/6FS
R927	40-16-1471	FXD C FILM 470 OHM 5% 1/6W	RD1/6FS
R928	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W	RD1/6FS
R929	40-16-1681	FXD C FILM 680 OHM 5% 1/6W	RD1/6FS
R930	40-16-1681	FXD C FILM 680 OHM 5% 1/6W	RD1/6FS
R931	40-16-1561	FXD C FILM 560 OHM 5% 1/6W	RD1/6FS
R932	40-16-1561	FXD C FILM 560 OHM 5% 1/6W	RD1/6FS
R933	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R934	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R935	40-16-1471	FXD C FILM 470 OHM 5% 1/6W	RD1/6FS
R936	40-16-1471	FXD C FILM 470 OHM 5% 1/6W	RD1/6FS
R937	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R938	40-16-0001	FXD C FILM 0 OHM 5% 1/6W	RD1/6FS
R939	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R940	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R941	40-16-1821	FXD C FILM 820 OHM 5% 1/6W	RD1/6FS
R942	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W	RD1/6FS
R943	40-16-1821	FXD C FILM 820 OHM 5% 1/6W	RD1/6FS
R944	40-16-3121	FXD C FILM 12K OHM 5% 1/6W	RD1/6FS
R945	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R946	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R947	40-16-0001	FXD C FILM 0 OHM 5% 1/6W	RD1/6FS
R948	40-16-2151	FXD C FILM 1.5K OHM 5% 1/6W	RD1/6FS
R949	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W	RD1/6FS
R950	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W	RD1/6FS
R951	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R952	40-16-2151	FXD C FILM 1.5K OHM 5% 1/6W	RD1/6FS
R953	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R954	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R955	40-16-2151	FXD C FILM 1.5K OHM 5% 1/6W	RD1/6FS
R956	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W	RD1/6FS
R957	40-16-2391	FXD C FILM 3.9K OHM 5% 1/6W	RD1/6FS
R958	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R959	40-16-1821	FXD C FILM 820 OHM 5% 1/6W	RD1/6FS
R960	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R961	40-16-2391	FXD C FILM 3.9K OHM 5% 1/6W	RD1/6FS
R962	40-16-4101	FXD C FILM 100K OHM 5% 1/6W	RD1/6FS
R963	40-16-2471	FXD C FILM 4.7K OHM 5% 1/6W	RD1/6FS
R964	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R965	40-16-2151	FXD C FILM 1.5K OHM 5% 1/6W	RD1/6FS
R966	40-16-1561	FXD C FILM 560 OHM 5% 1/6W	RD1/6FS
R967	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R968	40-16-2681	FXD C FILM 6.8K OHM 5% 1/6W	RD1/6FS
R969	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R970	42-80-2471	FXD M FILM 4.7K OHM 1% 1/6W	RN1/6FS
R971	42-80-1221	FXD M FILM 220 OHM 1% 1/6W	RN1/6FS
R972	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W	RD1/6FS
R973	40-16-4151	FXD C FILM 150K OHM 5% 1/6W	RD1/6FS

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
R974	42-80-3101	FXD M FILM 10K OHM 1% 1/6W		RN1/6FS
R975	42-80-2501	FXD M FILM 5K OHM 1% 1/6W		RN1/6FS
R976	42-80-2501	FXD M FILM 5K OHM 1% 1/6W		RN1/6FS
R977	42-80-2391	FXD M FILM 3.9K OHM 1% 1/6W		RN1/6FS
R978	42-80-2501	FXD M FILM 5K OHM 1% 1/6W		RN1/6FS
R979	42-80-2501	FXD M FILM 5K OHM 1% 1/6W		RN1/6FS
R980	42-80-2391	FXD M FILM 3.9K OHM 1% 1/6W		RN1/6FS
R982	42-80-2181	FXD M FILM 1.8K OHM 1% 1/6W		RN1/6FS
R983	42-80-1201	FXD M FILM 200 OHM 1% 1/6W		RN1/6FS
R984	42-80-2181	FXD M FILM 1.8K OHM 1% 1/6W		RN1/6FS
R985	42-80-1221	FXD M FILM 220 OHM 1% 1/6W		RN1/6FS
R986	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R987	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
R988	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R989	40-16-3101	FXD C FILM 10K OHM 5% 1/6W		RD1/6FS
R990	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R991	40-16-1471	FXD C FILM 470 OHM 5% 1/6W		RD1/6FS
R992	40-16-3331	FXD C FILM 33K OHM 5% 1/6W		RD1/6FS
R993	40-16-2821	FXD C FILM 8.2K OHM 5% 1/6W		RD1/6FS
R994	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R995	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R996	40-16-2681	FXD C FILM 6.8K OHM 5% 1/6W		RD1/6FS
R997	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R998	40-16-0471	FXD C FILM 47 OHM 5% 1/6W		RD1/6FS
R999	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R1000	40-16-1221	FXD C FILM 220 OHM 5% 1/6W		RD1/6FS
R1001	40-16-4101	FXD C FILM 100K OHM 5% 1/6W		RD1/6FS
R1002	40-16-4101	FXD C FILM 100K OHM 5% 1/6W		RD1/6FS
R1003	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R1004	40-16-5101	FXD C FILM 1M OHM 5% 1/6W		RD1/6FS
R1005	40-16-4821	FXD C FILM 820K OHM 5% 1/6W		RD1/6FS
R1006	40-16-5101	FXD C FILM 1M OHM 5% 1/6W		RD1/6FS
R1007	40-16-2101	FXD C FILM 1K OHM 5% 1/6W		RD1/6FS
R1008	40-16-1121	FXD C FILM 120 OHM 5% 1/6W		RD1/6FS
R1009	40-16-0821	FXD C FILM 82 OHM 5% 1/6W		RD1/6FS
R1010	40-16-0821	FXD C FILM 82 OHM 5% 1/6W		RD1/6FS
R1011	40-16-0561	FXD C FILM 56 OHM 5% 1/6W		RD1/6FS
R1012	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R1013	40-16-2271	FXD C FILM 2.7K OHM 5% 1/6W		RD1/6FS
R1014	40-16-2681	FXD C FILM 6.8K OHM 5% 1/6W		RD1/6FS
R1015	40-16-3151	FXD C FILM 15K OHM 5% 1/6W		RD1/6FS
R1016	40-16-3121	FXD C FILM 12K OHM 5% 1/6W		RD1/6FS
R1017	40-16-2821	FXD C FILM 8.2K OHM 5% 1/6W		RD1/6FS
R1018	40-16-3151	FXD C FILM 15K OHM 5% 1/6W		RD1/6FS
R1019	40-16-3331	FXD C FILM 33K OHM 5% 1/6W		RD1/6FS
R1020	40-16-0101	FXD C FILM 10 OHM 5% 1/6W		RD1/6FS
R1021	40-16-0101	FXD C FILM 10 OHM 5% 1/6W		RD1/6FS
R1022	40-16-0101	FXD C FILM 10 OHM 5% 1/6W		RD1/6FS
R1023	40-16-0101	FXD C FILM 10 OHM 5% 1/6W		RD1/6FS
R1024	40-16-2221	FXD C FILM 2.2K OHM 5% 1/6W		RD1/6FS
R1025	40-16-5101	FXD C FILM 1M OHM 5% 1/6W		RD1/6FS
R1026	40-16-5101	FXD C FILM 1M OHM 5% 1/6W		RD1/6FS
R1027	40-16-5101	FXD C FILM 1M OHM 5% 1/6W		RD1/6FS
RV900	48-33-2100	VAR M GLAZE 1K OHM B	TEITSU	TM64K3(PV)

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040	
RV901	48-33-2200	VAR M GLAZE 2K OHM B	TEITSU	TM64K3(PV)
RV902	48-33-2200	VAR M GLAZE 2K OHM B	TEITSU	TM64K3(PV)
RV903	48-33-2500	VAR M GLAZE 5K OHM B	TEITSU	TM64K3(PV)
RV904	48-33-2500	VAR M GLAZE 5K OHM B	TEITSU	TM64K3(PV)
RV905	48-33-1500	VAR M GLAZE 500 OHM B	TEITSU	TM64K3(PV)
RV906	48-33-1500	VAR M GLAZE 500 OHM B	TEITSU	TM64K3(PV)
RV907	48-33-3100	VAR M GLAZE 10K OHM B	TEITSU	TM64K3(PV)
RV908	48-33-3100	VAR M GLAZE 10K OHM B	TEITSU	TM64K3(PV)
RV909	48-33-1500	VAR M GLAZE 500 OHM B	TEITSU	TM64K3(PV)
RV910	48-33-1500	VAR M GLAZE 500 OHM B	TEITSU	TM64K3(PV)
RV911	48-33-1100	VAR M GLAZE 100 OHM B	TEITSU	TM64K3(PV)
RV912	48-33-2100	VAR M GLAZE 1K OHM B	TEITSU	TM64K3(PV)
U902	35-70-0007	QUAD 2-INPUT POSI-NAND		MM74HC00N
U903	35-70-0008	QUAD 2-INPUT NAND	HITACHI	HD74LS00P
U904	35-70-0043	HEX INVERTERS	HITACHI	HD74LS04P
U905	34-90-0090	SAMPLE & HOLD IC (15MHZ)	TEXAS INC.	TL1591CP
U906	34-90-0090	SAMPLE & HOLD IC (15MHZ)	TEXAS INC.	TL1591CP
U911	35-70-0047	HC-MOS HEX INVERTER	N.S	MM74HC04N
U912	35-70-1511	1-OF-8 DATA SELEC./MULTIP.	TEXAS INS.	SN74LS151N
U913	35-70-1123	DUAL J-K F-F WITH P/C	HITACHI	HD74LS112P
U914	35-70-1573	QUAD 2-TO-1 DATA SELECTORS	HITACHI	HDLS157P
U922	35-70-3931	DUAL 4 BIT BINALY COUNTER	HITACHI	HD74LS393P
U923	35-70-3901	DUAL DECADE COUNTERS	TEXAS INS.	SN74LS390N
U924	35-70-1573	QUAD 2-TO-1 DATA SELECTORS	HITACHI	HDLS157P
U925	35-56-0210	CCD CLOCK DRIVER	MASTUSITA	MN3104
U926	35-56-0200	CCD ANALOG MEMORY	MASTUSITA	MN8028A
U931	35-70-1123	DUAL J-K F-F WITH P/C	HITACHI	HD74LS112P
U932	35-70-1123	DUAL J-K F-F WITH P/C	HITACHI	HD74LS112P
U934	35-70-3743	OCTAL D-TYPE F/F	FAIRCHILD	F74F374PC
U935	35-56-0210	CCD CLOCK DRIVER	MASTUSITA	MN3104
U936	35-56-0200	CCD ANALOG MEMORY	MASTUSITA	MN8028A
U941	35-70-0864	QUAD 2-INPUT EXCLUSIVE-OR	HITACHI	HD74LS86P
U942	35-70-1381	3LINE TO 8LINE DECORDER	HITACHI	HD74LS138P
U943	35-70-0321	QUAD 2-INPUT POSI-OR	TEXAS INS.	SN74LS32N
U944	35-70-3747	OCTAL D-TYPE F/F	HITACHI	HD74LS374P
U945	36-20-0080	D/A CONVERTER 8BIT	HITACHI	HA17408P
U946	36-20-0080	D/A CONVERTER 8BIT	HITACHI	HA17408P
U947	36-30-0170	A/D CONVERTER 8 BIT 1.5US	N.S	ADC0820CCN
U948	34-00-0270	DUAL OP-AMP	N.S	LF353N
U949	34-00-0171	OPE-AMP (FET-INPUT)	N.S	LF351N
U951	35-70-0743	DUAL D F-F EDGE TRIGGER	HITACHI	HD74LS74P
U952	35-70-0321	QUAD 2-INPUT POSI-OR	TEXAS INS.	SN74LS32N
U953	35-70-1931	4 BIT UP/DOWN BINARY COUNTERS	HITACHI	HD74LS193P
U954	35-70-3747	OCTAL D-TYPE F/F	HITACHI	HD74LS374P
U955	35-70-1741	HEX D-TYPE FLIP FLOP	TEXAS INS.	SN74LS174N
U956	35-70-0746	DUAL D F-F EDGE TRIGGER	TOSHIBA	TC74HC74P
U957	34-69-0030	TRIPLE 2-CHANNEL MULTIPLEXER	TOSHIBA	TC4053BP
U958	34-40-0170	REGULATOR 5V 0.15A	TOSHIBA	TA78L005P
U959	34-00-0340	FET INPUT DUAL OP AMP	TEXAS INS.	TL082CP
XTL900	93-00-0210	QUARTS HC-49/U 25MHZ	KIKUSUI	S8409221
XTL901	93-00-0200	QUARTS HC-49/U 20MHZ	KIKUSUI	S8409211

A7 ASSEMBLY

REFERENCE DESIGNATOR	KIKUSUI PARTS NO.	DESCRIPTION	DSS 5040
C340	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
C341	52-03-3469	FXD CER 0.01UF +100-0% 500V TYPE2	
CR320	32-30-1200	DIODE VR=60V IO=1A	HITACHI 1SS120
CR321	32-30-1200	DIODE VR=60V IO=1A	HITACHI 1SS120
R380	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
R381	40-16-3101	FXD C FILM 10K OHM 5% 1/6W	RD1/6FS
RV111	45-35-3108	VAR C COMP 10K OHM	V16L4SN15KC
RV211	45-01-0681	VAR C COMP 10K OHM WITH SW	V16L4SN15KC
S302	81-04-0250	PUSH SWITCH	ALPS SUE40

B8 ASSEMBLY

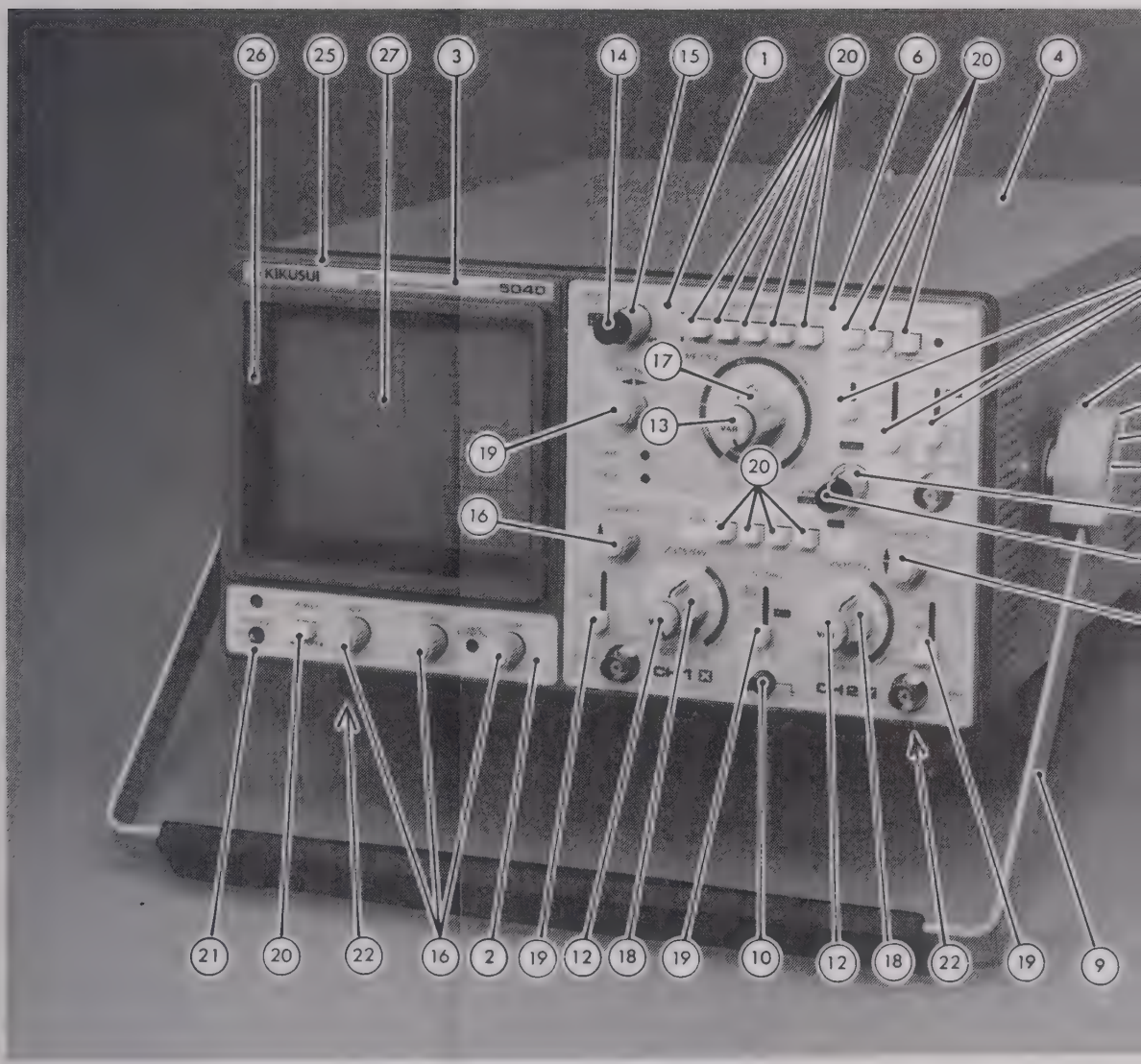
AHV ASSEMBLY

C657	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C658	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
C671	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C672	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C673	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C674	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C675	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C676	52-98-1010	FXD CER 1000PF +80-20% 6.3KV TYPE1	
C699	52-98-1000	FXD CER 4700PF +80-20% 3.15KV TYPE1	
CR656	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
CR681	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
CR682	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
CR683	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
CR684	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
CR685	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
CR686	32-90-1951	DIODE VR=6KV FAST RECOVERY	SANKEN GHV-06SSN
R660	40-16-3221	FXD C FILM 22K OHM 5% 1/6W	RD1/6FS
R1661	40-37-6101	FXD C FILM 10M OHM 5% 1/2W	
T651	63-92-0170	DC-DC CON TRANS HV-4	KIKUSUI S8409234

3.4.7 Mechanical Parts

DSS 5040

NO.	CODE	DESCRIPTION	REMARK
1	A1-509-991	FRONT PANEL	
2	A1-510-002	FRONT PANEL (CRT)	
3	A8-509-901	NAME PLATE DSS 5040	
4	B2-510-501	CASE	
5	B6-509-911	PLATE REAR	REAR
6	C1-510-001	SUB PANEL	BEHIND FRONT PANEL
7	E6-050-061	HANDLE STOPPER-1	
8	E6-050-071	HANDLE-STOPPER-2	
9	E6-510-501	CARRYING HANDLE	
10	L4-510-001	GND TERMINAL	
11	L5-050-011	SPRING (FOR HANDLE)	
12	N1-510-003	KNOB R12W (205) -VAR	
13	N1-510-004	KNOB R14W (205) -VAR	
14	N1-510-005	KNOB R11W (525) -3.2	
15	N1-510-006	KNOB R13W (YR)	
16	N1-510-008	KNOB R11S (YR) -K	REAR
17	N1-510-010	KNOB D22W (YR)	
18	N1-510-011	KNOB D18W (YR)	
19	N9-510-001	KNOB FOR LEVER SWITCH	
20	N9-510-002	PUSH BUTTON	
21	P2-000-291	CAL TERMINAL	
22	P2-000-381	FOOT (20-17)	BOTTOM
23	P2-510-002	CAP (HANDLE)	
24	P3-510-001	CORD HOLDER	REAR
25	P9-510-001	FRONT FRAME	
26	P9-510-002	BEZEL	
27	S4-510-001	FILTER (GRAY)	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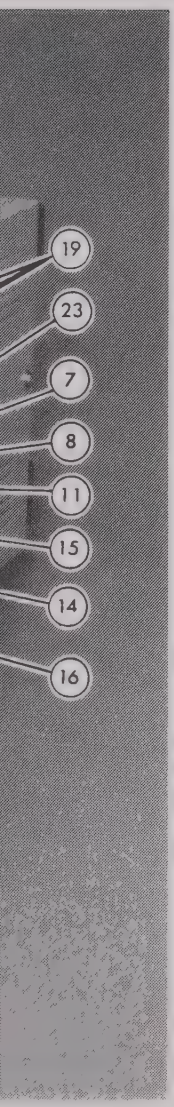
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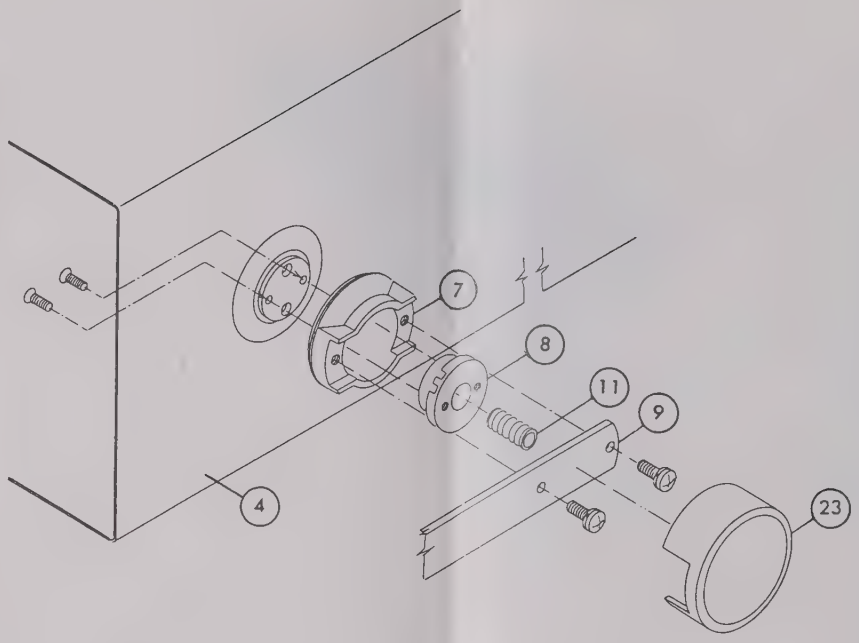
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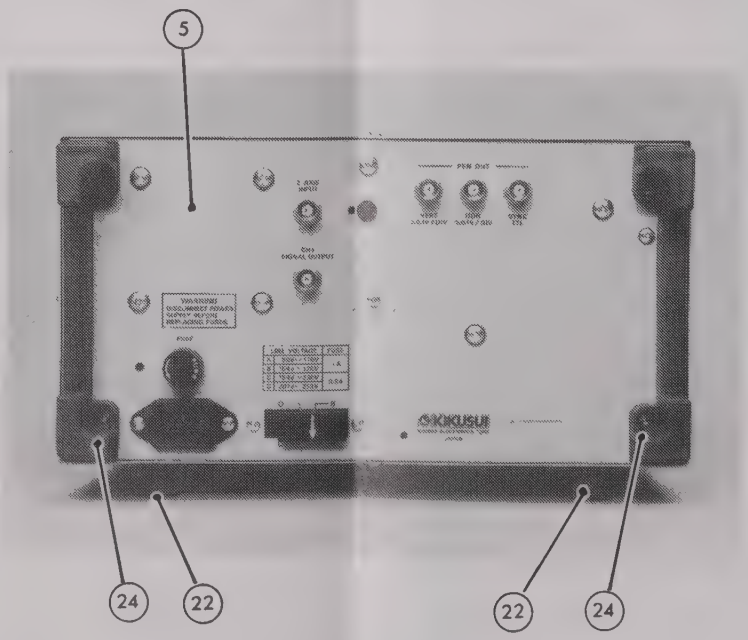
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